The GENTLEMAN and LADY's
ALLADIUM,

For the Year of our LORD, 1760.

CONTAINING,

WISDOM of GOD in his WORKS. An *Academical*
SCELLANY of NEW IMPROVEMENTS in Science.
th the FESTIVALS and *remarkable* DAYS. And an
HEMERIS for the *ſaid* YEAR: computed from a *New*
EORY, agreeing with *Obſervation.* NEW TABLES
COMPUTATION for *Greenwich-Royal*-OBSERVA-
RY. With *Remarks* on the *New* Diſcovery of the LON-
TUDE.

The *Twelfth* Number publiſhed.

e AUTHOR of the *Royal* ASTRONOMER and NAVIGATOR.

Wale inv et del. *J. S. Muller Sc*

How *various* are thy WORKS, CREATOR WISE!
How to the Sight *Beauties* on *Beauties* riſe!
Where ev'ry OBJECT ſhines divinely *bright*,
And TRUTH appears in her own native LIGHT!

ted for J. SCOTT at the *Black-Swan*, in *Pater-noſter-Row*,
MDCCLX.

BRITISH MUSEUM

OF THE Wiſdom of GOD in his Works.

OF GOD's INFINITE POWER AND GOODNESS.

THAT a Being neceſſarily and independently exiſting, poſſeſs'd of infinite *Wiſdom*, *Power*, and *Happineſs*, ſhould exert his *Power* in producing *innumerable* Multitudes of Creatures, and Worlds for their convenient Habitation and Happineſs, could proceed only from his infinite and *unbounded Goodneſs*. For, as to the *Notion* of his creating the Univerſe and it's Inhabitants with a View to his own *Glory* (who is independent) or to the Praiſe of his finite, dependent, and imperfect Creatures, is inconſiſtent with his *Supremity*, as an infinite GOD; in whoſe Sight the *whole* created Univerſe, with all its Inhabitants, are but as a *few* floating *Atoms* in the Sun Beams.

The Extenſiveneſs of the *divine Goodneſs* appears in his having condeſcended, from the Exaltation of his infinite Perfection, to provide a *ſuitable* Meaſure of Happineſs for every Order of his Creatures; from the higheſt *Archangel* down to the loweſt *Reptile:* for, by what we ſee in this *Part* of the *Univerſe*, where we inhabit, we have Reaſon to conclude, that Happineſs is allotted to every Order and *Rank* of Beings, ſuitable to their ſeveral Capacities, thro' the *whole*.

GOD *as he fram'd the whole, the whole to bleſs,*
On mutual Wants built mutual Happineſs. POPE's Eſſays.

Having ſhewn the infinite *Power* and *Goodneſs* of GOD, his *infinite Wiſdom* will alſo appear in the Works of his Creation.

OF VEGETATION AND ATTRACTION.

VEGETATION, or the Growth of all Sorts of *Plants*, from the ſmalleſt Spire of *Graſs* to the talleſt *Oak*, with the Productio of all Kinds of *Fruits*, *Herbs*, *Roots*, *Grains*, and medicinal *Plants*, is brought about by the ſame ſimple and uniform *Principle* or Cauſe of *Attraction*, with which all bodily *Subſtance* are endued: Whereby the ſmall *Tubes*, of the infinite Numbe compoſing each Vegetable, gradually draw in the fluid Nouriſhment, which enlarges the Size thereof, and being concocted by the Sun's Heat, they are matured and thereby brought to Perfection.

That there is ſuch a *Principle* as *Attraction*, in Nature, ap pears by the Experiment of a ſmall Glaſs Tube or Pipe; o End of which being immers'd in a high colour'd Liquor, th *Fluid* will always viſibly aſcend to a conſiderable Height.

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The Beating of the *Heart*, and Circulation of the Blood in *Man*, and all other Creatures, is aſcribed in the ſame Manner to ſome general or ſimple *Cauſe*, whether it be the *Weight* of the Atmoſphere, or whatever *elſe*.

Sir *Iſaac Newton* has made it plainly appear, that it is by one ſimple and uniform *Cauſe*, that a Stone or other heavy Body falls to the Ground, and that the *Moon* and all the *Planets*, *Satellites*, and *Comets* are kept in their Orbits, and made to revolve round their reſpective Centers of *Gravitation* or *Attraction*.

SEASONS PRODUCED.

IT is alſo known, that the whole Variety of *Seaſons* is owing to the moſt *ſimple* and obvious Contrivance that can be imagined; *that is*, to the Inclination of the Earth's *Axis* with the Plane of the Ecliptic.

EFFECTS OF WARMTH.

WHAT a *Number* of important *Effects* are produced by a ſmall Degree of *Warmth*, that depends upon the preciſe Situation of our Earth, at ſuch a Diſtance from the SUN, as is ſuitable to the *State* of it's Inhabitants? Every Obſerver may purſue this Conſideration in his own Mind, who will find the Truth of the Obſervation hold good univerſally throughout the WORKS of all Nature.

SEVERAL NOBLE ENDS PRODUCED from ONE ELEMENT or CAUSE.

Another *general Obſervation* may be made, on the Works of Creation, ſetting forth the *Divine Wiſdom*, as much as any of the wiſe Contrivances that can be remark'd; which is, that there is not one Part or Member of the immenſe Whole, but what ſerves to ſeveral *different Purpoſes* at the ſame Time, and anſwers each of its various Ends as fully as if it had been intended for that one ſingle Purpoſe. We may conſider, under this *Head*, every *Species* of the Brute Creation, which at the ſame Time were made to enjoy a certain Portion of Happineſs, were alſo made to ſerve either for our *Nouriſhment*, for the *Culture* of our Lands, for our *Clothing*, for Food to other Creatures deſtined for our Nouriſhment, and other Uſes of Creation ſubſervient to one another. In like Manner we may conſider the Air anſwering the End of *Reſpiration*, while it ſerves for the *Conveyance* of the winged Race, for *Navigation*, for raiſing *Clouds* and Vapours, from whence Dew and Rain deſcend to the Earth, ſo neceſſary for *Vegetation*; for correcting and clearing the Earth of noxious and peſtilential Vapours, by Means of its Currents, or Winds; for refracting or bending the Sun's Rays, by which means we enjoy his Light both before he is riſen, and after he is ſet; and to which Cauſe we owe the grateful Morning and Evening Twilight; for working ſeveral *Machines*, Windmills, and the like; for being the Vehicle of all Manner of Sound, and producing the noble Effects of *Muſic*, from all kinds of muſical Inſtruments; and various other important Purpoſes; among which it may be obſerved that *Gunpowder* is of uſe only by means of Air, and would be entirely uſeleſs without it. And in the ſame Manner any other elementary Part of Nature may be conſidered as miniſtring to different Ends; as we may find the minuteſt Object we can caſt our Eyes or turn our Minds upon, is made to anſwer more Purpoſes than one.

An ingenious *Mechanic* is admired for the Exactneſs of his Machine made to anſwer the *ſingle Purpoſe* it was deſign'd for; and more Purpoſes are not expected from its curious Contrivance. A good *Water Engine* could never anſwer the End of an *Aſtronomical* Clock, an Air-*Pump*, and *Windmill* at the ſame Time; and the more complicated the human Machine, the leſs perfect and exact are the Movements. In the Divine Contrivances and Workmanſhip, it is far otherwiſe, where we may obſerve innumerable and different important Purpoſes produced by one ſimple and uniform *Cauſe*, and all theſe Purpoſes or Effects as regularly and properly brought about, as if a diſtinct Cauſe had been appointed to produce each ſingle Deſign.

VARIETY and UNIFORMITY *throughout* the CREATION.

Another *general Obſervation* of the *Wiſdom* that appears in the Divine Workmanſhip, is, that throughout the known Univerſe there appears an *aſtoniſhing Variety* united with the moſt regular *Uniformity*; and Uniformity amidſt Variety is the Idea of *Beauty* and *Perfection*: which two Properties ſeem to vie with each other as far as our Reſearches, in Nature, extends. If we conſider either the Animal or vegetable World, the Inhabitants of Land, or of the Waters, the Minute or the Great Bodies in Nature, in every reſpective *Species*, the Variety how extenſive! yet the Uniformity how cloſe! The Difference between the ſpreading *Oak* or towering *Cedar*, and the humble Shrub, how great! yet the Reſemblance how near! Nor are there any two Trees or Plants of *different Species*, but what differ eſſentially; nor even any two of the *ſame Species* to be found exactly alike: yet are all form'd on the ſame *general Plan*; all produc'd from Seeds, and vegetating in the ſame uniform manner, from the ſame Principle.

Again it may be obſerved, how many Millions of the *Animalcula* diſcover'd by the help of *Microſcopes* in Vinegar, in Pepper-Water, in Infuſions of almoſt all kinds of vegetable Subſtances, and indeed throughout the *Air*, *Earth*, and *Water*, would go to make up the Weight of an *Elephant* or a *Whale*? Yet each *Animalcula*, though of a *Size* ſo ſmall, as ſome are known to be, that a Grain of Sand is big enough to cover and ſmother ten Thouſand of 'em, has a *Body*, *Head*, *Eyes*, and *Mouth*, and probably a *Brain* and *Heart*, and, without Doubt, *Veins*, *Arteries*, and a *Fluid* circulating through them; and alſo *Nerves*, *Muſcles*, *Tendons*, and moſt of the Parts of the *largeſt Animals*. How different are the Elements of Air and Water, ſo that the Inhabitants of one cannot, generally ſpeaking, ſubſiſt in the other? Yet theſe Elements or Fluids, agree in moſt of their uniform Properties. How different is the manner of Life of the Inhabitants of the Land and Water? Yet how nearly allied to one another in the Frame of their Bodies and Senſes. And how endleſs *Variety* appears in the Properties and Effects of different Material Subſtances. How different a *Lump* of Lead from a Piece of *Cork*? An *Ingot* of Gold half a Foot long and half an Inch thick, capable of being drawn out into a *Wire* to reach from *London* to *York*, how different from the Subſtance of a *Rock*, or Sand of the *Mine* in which this *Metal* is found? And how different that Wonder of Nature, the *Loadſtone*, in the Effects it produces, from the common *Pebble*: *Quickſilver*, by *Chemical* Operation, is capable of numerous Changes in its Colour and Conſiſtence, which in one *State* is a deadly *Poiſon* and in another a noble *Medicine*, which may be forc'd by Fire into a hundred different Shapes, yet after all may be reduced to its original running *Mercury*. And the Life of Man is too ſhort to make all the Experiments that the Mineral called *Antimony* is capable of, in the various Changes it may undergo in its Form, and Noble Effects, to be thence derived on the human Body. A little *Rain-Water* ſtrain'd through the Veſſels of the *Vine*, forms its *Root*, the *Wood*, the *Bark*, the *Pith*, the *Leaves*, the *Bloom*, and the *Fruit*, all different in Qualities, as well as in their outward Appearances and Effects; yet come all under the Diſtinction of one general Claſs of *Vegetable Subſtances*.

VARIOUS PRODUCTIONS of the VINE.

THE Fruit of the *Vine*, before it is ripe yields Verjuice, a Liquor quite different from all other vinous Ones; which when ripe and dried in the Sun affords a fœtid Oil and hot Spirit, by Diſtillation. If the Grapes be dried and boiled they make a ſweet Liquor, which being diſtill'd yields an Oil and Spirit much like thoſe from Raiſins; The Juice of the Grape ſqueez'd out and fermented becomes firſt a ſweet and turbid Liquor, call'd *Muſt*, which is quite different in Nature and Effects from Wine. This Liquor by Degrees becomes leſs ſweet, and clearer, and is at laſt matur'd into Wine; which, by Diſtillation, affords an inflamable Spirit. It will alſo, in *Chriſtallization*, ſhoot into Salts, and yield a great Proportion of a Liquor as ſweet as Honey. Beſides the Wine itſelf, the fermented Juice of Grapes affords *Lees* and *Tartar*, which laſt may be analiſed into *five* different Subſtances; all leſs *acid* than Tartar itſelf. *Wine* likewiſe degenerates into Vinegar, from which may be obtain'd a Spirit, by Fire, and a Salt different from thoſe of *Tartar*. Thus the ſame Original

Matter, a little *Puddle-Water*, may be chang'd into almoſt *thirty* different States in this ſingle Plant.

GENERAL PROPERTIES of MATERIAL SUBSTANCES.

But Naturaliſts ſhew that *Salts*, *Acid*, *Alkaline*, *Volatile*, and lixiviate; *Spirits*, *vinous*, *urinous*, and *acid*; *Oils* of all Kinds; *Sulphurs* of all kinds, and even *Mercury*, may be produc'd out of almoſt all kinds of Subſtances. However, amidſt all this endleſs Variety of the Properties of Matter, it is certain that all material Subſtances agree in the general Properties of *Extenſion*, *Gravity* and *Impenetrability*.

And further, if we conſider the whole Solar *Syſtem*, under the Head of *Variety* and *Uniformity*, no two Planets can therein be found whoſe *Periods*, *Magnitudes*, *Velocities*, *Diſtances*, or *Planes*, are the ſame; yet all agree in being nearly of a round Figure, and in being carried round their Centers of Motion, nearly in Circles, with Velocities in a certain general Proportion to their reſpective Diſtances.

All BEINGS of DIFFERENT SYSTEMS have SIGHT.

The *Fix'd Stars* are in all Probability very different from one another in Magnitude, in their Revolution round their own *Axes*, and other Circumſtances; but they all agree in being *luminous Bodies*; and if Aſtronomers are right in ſuppoſing them all to be Suns to different *Syſtems*, with their reſpective planetary Bodies moving round them, the Inhabitants of thoſe Planets, however they may differ from one another, may, yet be ſuppoſed with Probability, all to agree in one Circumſtance, of being Creatures univerſally endowed with the Senſe of *Seeing*; or to what Purpoſe are they furniſh'd with ſuch a Profuſion of Luminaries!

WISDOM defin'd and SHEWN.

The proper *Definition* of Wiſdom is the *chooſing the fitteſt Means to accompliſh the greateſt Ends.* The principal and great End the *Supreme Being* had in view at his Creation of the Univerſe, was the Happineſs of innumerable rational and ſenſitive Creatures; than which Deſign a greater and more important one cannot be imagined. And that the *Divine Wiſdom* has choſen, in every *Inſtance*, the very beſt, or rather the only Means, for anſwering each reſpective End, and likewiſe a Variety of Ends by one and the ſame ſingle Means, is not only demonſtrable *a Priori*, from the infinite Wiſdom of God admitted, deducible too from the Works of the whole Creation; but is likewiſe to be proved *a poſteriori*, from Experience and Obſervation of his Works, as far as our Enquiries are able to go; and the more deeply we ſearch into his admirable Works, the more of deep Contrivance and Deſign we find, and the more of Fitneſs in the ſeveral Cauſes to produce the intended Effects.

But the *Greatneſs* of that Power and Wiſdom which has been exerted in every Object of the *Creation*, will beſt appear by conſidering the GREAT WORKS of the *Sun*, *Moon*, *Planets*, *Satellites*, *Comets* and *fix'd Stars*. The largeſt and beſt *Teleſcopes*, and the *Sagacity* of the ableſt Aſtronomers, have furniſhed us with an amazing Account of our *Solar* Syſtem, and of the *Immenſity* of Creation.

BY WHAT MEANS the DISTANCES of the GREAT BODIES are KNOWN.

FIRST it is proper to obſerve, that the *real Magnitudes*, *Diſtances*, *Orbits*, and other Affections of the great Bodies of our Syſtem are determined by what Aſtronomers call the *Parallaxes* of thoſe Bodies; and by their *Elongation* from the Sun, their *apparent* Magnitudes, and other analogical Methods, when their Diſtances are not too great to afford a certain *Parallax*, which would require too much Room here to explain. ASTRONOMERS, for *Example*, know certainly the Diſtance of the Moon from the Earth to be 240 Thouſand Miles; becauſe the Moon yields a very ſenſible *Parallax*. And they know that the Sun's Diſtance from the Earth is at leaſt ten Thouſand times the Diameter, or Thickneſs of the Earth, which is about eight Thouſand Miles; and brings the whole Diſtance of the Earth from the Sun to about eighty *Millions* of Miles; this is the *leaſt* Number of Miles, not to be doubted, that the Sun is from our Earth; but it is not certainly known whether his Diſtance from thence may not be a great deal more. **In the *Year* 1761, the Diſtance of all the Planets from the Sun will be determined to a greater Degree of Exactneſs than heretofore; by an Obſervation of the *Tranſit* of the Planet *Venus* over the Sun's Face; which will happen on *June* 6^{d}. 5^{h}. 55^{m}. Morning, in that Year, N. S. 4′ 15″ South of the Sun's Center.** But according to the preſent *Theory*, the Sun, to appear of the Magnitude he does to our Eyes, at the Diſtance of eighty Millions of Miles, muſt be a Body almoſt eight hundred Thouſand times larger than our Earth. So that if the Sun's Center were plac'd where the Center of the Earth now is, his outward Surface would extend 140 Thouſand Miles higher than the Orbit of the *Moon*; his Diameter or Thickneſs being 760 *Thouſand* Miles; whereas the Thickneſs of the Earth is but about eight thouſand.

AN ACCOUNT OF THE SOLAR SYSTEM.

This *amazing* World of Fire, the SUN, turns round his own *Axis* in 25 Days, and 6 Hours. This is known by a Number of *duſky Spots*, appearing upon the Sun's Face, ſo as to be ſeen ſometimes with the naked Eye, when he ſhines thro' a *Miſt*, or thin Cloud; but are always obſervable by the Help of a

Teleſcope, with a dark Glaſs, for the Security of the *Eye*. Theſe Spots could not be viſible at the Sun's Diſtance, if they were not as large as the whole Earth; but ſuch of them as appear of a conſiderable Breadth, as they often do, muſt be vaſtly larger than the Earth. They never continue long to make the ſame Appearance; but are frequently riſing and vaniſhing. They are moſt probably, *Exhalations*, floating in the Sun's Atmoſphere, at ſome Diſtance from his Body. His Circumference is computed to be about 2 Million, 398 Thouſand Miles. He is agitated by the various Attractions of the Bodies, revolving round him, to deſcribe a ſmall *Circuit* round the Center of the *Syſtem*. This *glorious Luminary*, the Center of our Syſtem, has *ſix* opaque Globes, beſides their *Attendants*, commonly called the Planets, going round him at different Diſtances, and in different *Periods* of Time, all from *Weſt* to *Eaſt*, (cauſing his apparent Motion to us from *Eaſt* to *Weſt*) according to the following Order.

OF MERCURY.

I. MERCURY, about 1 *twentieth* Part as big as our Earth, finiſhes his Courſe in 87 Days, 23 Hours, being his Year; at the Diſtance of about a Thouſand of the Earth's Diameters, or 32 *Millions* of Miles from the SUN. But no *Spots* appearing on his *Face*, or Surface, and being view'd ſo near the Sun, that the Time of his Turning round on his *Axis*, or the Length of his Days and Nights, as yet is not known. His Circumference is about 13 Thouſand 3 Hundred Miles: Who moves at the Rate of about 16 Hundred and 5 *Miles*, every *Minute* of Time, in his Orbit. The Heat of the Sun in *Mercury* (if there is no Proviſion made to abate it) muſt be ſuch as would keep all the Waters upon Earth conſtantly boiling: And the Brightneſs of the Sun's Light muſt there be quite intolerable to Eyes like ours. But it does not follow from thence that *Mercury* is therefore uninhabitable; ſince it can be no Difficulty for the divine Power and Wiſdom to accommodate Inhabitants to the Place they are to inhabit; as we ſee *Frogs* and *Fiſhes* endure *Cold* very well, that would ſoon deprive our *Species* of Life. To an Eye ſuch as ours, the Sun ſeen from this Planet would appear ſeven Times as large as he appears to us. *Mercury* is ſeen with *Teleſcopes* in all the Shapes of the Moon except Full; ſometimes horned, and ſometimes like a half-Moon, but never fully enlightened; becauſe that Side of this *Planet* on which the Sun ſhines is never turn'd full towards us; except when he is ſo near the Sun as to be loſt in the Brightneſs of his Beams. His enlighten'd Side is always towards the Sun, which ſhews that he only ſhines by his borrowed Light from the Sun. That this Planet revolves round the Sun in an Orbit nearer to him than that of the Earth is plain; becauſe he is never ſeen oppoſite to the Sun, but always in the *Weſt*, when he is ſeen at *Sun-Setting*; but in the *Eaſt* when he is ſeen at *Sun-Riſing*; and at a Diſtance from the

Sun never above 28 *Degrees*; a Degree being about twice the apparent Breadth of the *Sun* or *Moon*.

Mercury's Orbit is inclined 7 Degrees to the Earth's Ecliptic; and the Place of his aſcending *Node*, where he croſſes the Ecliptic to the Northward is in about 16 Degrees of *Taurus*, in the Year 1780, the oppoſite Point of the Ecliptic to which, when he croſſes the deſcending *Node* to the Southward is in 16 Degrees of *Scorpio*. to which Places the Sun apparently comes on the 5th *May* and 7th *November*, N. S. And when *Mercury* comes to either of his *Nodes* at his *Inferior Conjunction*, at or near theſe Times, he will be ſeen to paſs over the Face of the Sun, like a dark round *Spot*. But, in all other Parts of his Orbit, his Conjunctions are inviſible; becauſe he paſſes above or below the Sun.

By Computation MERCURY paſſes over the SUN's Face, viſible at *Greenwich*.

New Style.	1782	*Nov.*	12^{d}	3^{h}	44^{m}.	Afternoon	15′½ N	from ⊙ Center.
	1786	*May*	4	6	57	Forenoon	12′¾ N	
	1789	*Dec.*	6^{d}	3^{h}	53^{m}	Afternoon	7′⅓ S	from the Sun's Center.
	1799	*May*	7	2	34	Afternoon	4′⅕ S	

N. B. *There will be ſeveral intermediate Tranſits, but inviſible.*

There are other Properties of *Mercury* and his Orbit; of his *Seaſons, &c.*

Of Venus.

II. Venus, at the Diſtance of about 59 Million of Engliſh Miles, revolves round the SUN, in 224 Days 17 Hours of our Time nearly; at the Rate of 1 *Thouſand* 146 Miles per Minute, in her *Orbit*, including in it the Orbit of *Mercury*: For ſhe is always ſeen in the Neighbourhood of the *Sun*, and never appears in the *Weſt*, when the Sun is in the *Eaſt*, nor contrariwiſe, nor ever removes above 48 Degrees from him. When ſhe is on one Side of her Orbit, Weſt of the Sun, ſhe is our *Morning Star*; and when on the other Side of her Orbit, Eaſt of the Sun, is our *Evening Star*; being each by Turns for 290 Days. This may ſeem ſurprizing that *Venus* ſhould be longer on the Eaſt or Weſt Side of the Sun than the Time ſhe takes to perform her Revolution round the Sun, in about 225 Days; but, if we conſider that the Earth is going all the while round the Sun, with the *Obſervator* upon it, the ſame Way with, tho' not ſo quick as, *Venus*, the Wonder vaniſhes; becauſe the Difference of the Motions between the *Earth* and *Venus* will be equal to the Motion gone forward of the Earth by *Venus*, in 290 Days, being but about 179 Degrees of a Revolution of *Venus* with the Earth, performed not in leſs than 584 Days, *nearly*.

This Planet is about the Bigneſs of the Earth, and turns on her *Axis* in 23 Hours, as the Earth turns on her's in 24 Hours. She appears thro' a *Teleſcope* in all the Shapes of the

Moon to a naked Eye, partly enlighten'd and partly dark, and with the ſame *Inequalities* on her Face, as on that of the Moon. Some *Aſtronomers* fancy they have ſeen a Moon or Satellite near *Venus*, but have not yet aſſur'd themſelves of it; but may at her Conjunction with the Sun, 1761, when it can hardly be hid all the 6 Hours *Venus* is on the Sun's Face, if there be a Satellite.

The Orbit of *Venus* is inclined to the Earth's Orbit about 3½ Degeees, and croſſes it in about 14½ of *Gemini* and *Sagittary*, and conſequently when the Sun is apparently at or near theſe Points in her *inferior* Conjunction with the Sun, ſhe will appear like a *black Patch* on his Face; and will afford a Method of determining the Diſtances of all the Planets from the Sun (as we before obſerved) more certain than heretofore known. Theſe Appearances but ſeldom happen, and will be but three Times viſible at *Greenwich*-Obſervatory for 300 Years to come, as follows.

VENUS will appear on the SUN's FACE.

New Stile	1761 *June*	6^d	5^h	55^m	M.	4'	15''	South	from ☉'s Center.
	1996 *June*	8	2	13	Af.	13	36	South	
	2004 *June*	6	7	18	Fo.	6	22	Nor.	

N. B. There are other Properties of *Venus* and her Orbit; of her Seaſons, *&c.*

OF THE EARTH.

III. THE EARTH, which we inhabit, poſſeſſes the next Place in our *Syſtem*, and, at the Diſtance of about 80 *Millions* of Miles from the Sun, performs her yearly Revolution round him, in 365 Days 5 Hours and 49 Minutes of Time from the *Æquinox* or *Solſtice* to the ſame Points again; but not till after 365 Days 6 Hours 9¼ *Minutes*, from any *Fix'd Star* to the ſame again; the former being call'd the *Tropical*, and the latter the *Sidereal* Year.

The Earth's Motion in its Orbit, tho' 120 Times ſwifter than that of a Cannon-Ball, is but little more than *half* the Swiftneſs of *Mercury*'s in his Orbit.

It's Motion is like that of a *Bowl* upon a *Bowling-Green*; proceeding forward at the Rate of about 968 Miles in a *Minute* of Time, along its Orbit, while it turns partly round its *Axis*, or carry its Inhabitants at the Equator, about 17 *Miles* in that Minute.

There is no more Reaſon to doubt that the Earth moves, in this Manner, round the Sun than there is for a Paſſenger in a Ship ſailing in a River or ſmooth Water, to doubt whether the Ship he was in moved, or the Objects on the Shore, that appear'd to move. We ſee the Sun continually change his Place with reſpect to the *fix'd Stars*, and muſt own it to be highly improbable that this Change is owing to any Change in the whole Heavens; which conſidering the amazing Diſtance of the *Starry Heavens*, would require a Motion infinitely more rapid than that which is aſcribed to the Earth. As for the common *Objection* againſt the Earth's Motion, that we are inſenſible of it, and that a Stone thrown up from the Earth ought not to fall down on the ſame Place again; it is anſwer'd at once by a Ship moving ever ſo ſwiftly along; from whence if a *Ball* be fired directly up in the Air, or let fall from the Maſt-Head, it will fall exactly in the ſame Place on the Ship's Deck, as if She had no Motion, or were at an Anchor, as experience proves; and becauſe whatever Motion the Ship has forward, the ſame muſt be *exactly* communicated to the *Ball*, ſo as always to bear the ſame Relation to the Ship's Place. And as to the *Objection* taken from the *Scripture* Expreſſions, which ſeem to contradict the Theory of the Earth's Motion, it is plain, from innumerable *Inſtances*, that Revelation was not deſigned to make Mankind Philoſophers, or Reaſoners about the Nature of Things, but to improve them in Virtue and Morals. And therefore it was fit the Scripture Expreſſions ſhould be accommodated to the vulgar Opinion, and Notions of Men; eſpecially in all ſpeculative Points which had no direct Influence on Men's Lives and Morals. The Truth of this Matter is, that the incomparable Sir *Iſaac Newton* has demonſtrated the Motion of the Earth, with that of all the other *Planets*, and *Comets* round the Sun, and of the Satellites round their reſpective *Primaries*, on ſuch undoubted Principles, that he has eſtabliſhed the ſame beyond all Diſpute; except to thoſe who are void of Underſtanding. The Sun's apparent *Riſing* and *Setting* is found to be owing to the Earth turning round its *Axis* from Weſt to Eaſt, while it goes on in its Orbit, cauſing an apparent Motion thereby in the Sun from *Eaſt* to *Weſt*. And the Sun's apparent Change of Place, among the *fix'd Stars*, is found to be owing to the Earth's real Change of Situation, moving round the Sun. The different Seaſons of the Year, with all the delightful Varieties thereof, are found to be owing to the *Inclination* of the Earth's *Axis* to the Plane of the Ecliptic, in which the Sun always appears to move; being 66 Degrees 31 Minutes and a half, at this Time, 1760; but continually varies a ſmall Matter; owing to the combin'd Effects of the attracting Bodies, in their ſeveral Approaches to the Earth's Revolutions round the Sun.

Any Perſon, who has not an Opportunity of ſeeing an *Orrery*, may eaſily repreſent this Motion of the Earth round the Sun by an *Apple* or other round Body with a Skewer or *Wire* thruſt thro' its Middle, and carried about a round Table, with a Candle plac'd in the Middle thereof. If the lower End of the Skewer or *Wire* be made to touch the Table all the Way, while the *Object* moves round to them a little, the upper End ſtill pointing towards the ſame Part of the Room, by turning the *Skewer* round, as it is carried along, it will be eaſy to underſtand how the Earth's turning round on her *Axis*, makes a *Day* and *Night*; and by carrying the *Object* quite round the Table, it will be eaſy to ſhew how the Sun (repreſented by the *Candle*) muſt appear to change Place with reſpect to the *fix'd Stars*; and by obſerving how differently th

Candle enlightens the different Part of the *Apple*, or round Object in Motion, as the *Wire* points towards it, or from it, to the ſame Part of the Room, kept always *parallel*, the Cauſe of the different Seaſons, of the Length of the Days, and Nights, of the Sun's ſhining more directly, or more obliquely, on different Parts of the Earth, and of the Heat of *Summer*, and Cold of *Winter*, will appear to any Capacity. That the Earth is nearly of a round Figure is plain from the Shadow it caſts upon the Face of the Moon in a *partial* Eclipſe of that Body: Which Shadow is always round, and never ſeen in another Figure. And the Roundneſs of the Earth's Figure is further manifeſted in the gradual Approach of a Ship at Sea; firſt ſhewing it's *Maſts* and *Sails*, and then its lower Parts, 'till the whole is viſible; and the contrary happens of a Ship ſailing from us till ſhe is quite out of Sight. To which may be *added* the Proof of the Earth's Roundneſs from a Ship going round it by continual ſailing to the *Weſtward*, as has been often experienced. The *Hills* on the Earth's Surface no more hinder the *Roundneſs* of its Figure than Grains of Duſt hinder the Roundneſs of the artificial or common Globe; between which there is a like Proportion.

OF THE MOON.

The MOON is a Satellite, carried round the Earth (while the Earth moves round the Sun) in 27 Days, 7 Hours, and about 43 Minutes; but comes not again in *Conjunction* with the Sun (becauſe of the Earth's Motion the while) 'till 29 Days, 12 Hours, and about 44 Minutes, which is called the Moon's *Pyriodical* Revolution with the Sun. The Moon's Circumference is 6 Thouſand 850 Miles, add her Diſtance from the Earth 240 *Thouſand* Miles, moving in her Orbit about 38 Miles every Minute, turning round her *Axis* exactly in the Time ſhe moves round the Earth, by which Means ſhe keeps the ſame Side, or Face, always turn'd towards us; making her Night and Day together as long as our *lunar Month*. That the Moon goes round the Earth as her Center is evident to Sight; for when ſhe is between the Sun and Earth, at New, She is inviſible to us, her dark Side being then turn'd towards us; when ſhe goes a little way forward, from *New*, ſo as to come between us and the Sun, we ſee that ſmall Part of her Body enlighten'd, of the enlighten'd half next the Sun; and ſo on ſtill more and more, of the enlighten'd half next the Sun appears to us, till ſhe comes to be in full Oppoſition to the SUN, when we ſee all that Side of her Face, or *enlighten'd half*, which the Sun ſhines upon. This *Matter* is explain'd to any Capacity, by carrying a ſmaller Apple or Ball to repreſent the Moon, round the Earth, while ſhe is carried round the Sun, or Candle in the midſt of a round Table, and obſerving how the Candle enlightening the little *Ball* muſt appear to an *Inſect* upon the larger Ball of the Earth.

ECLIPSES of the SUN.

Whenever the Moon happens to come nearly or exactly between the Earth and the Sun, (happening at New Moon) ſhe ſtops the Light of the Sun ſhining upon the Earth, and then we ſay the Sun is eclipſed; though in reality the Earth is eclipſed. And according as the Moon happens to hide a Part or the whole of the Sun's Face, by her coming between the Sun and our Sight, we call it a *partial* or *total* Eclipſe of the Sun. If a total Eclipſe of the Sun happens when the Moon is at her greateſt Diſtance from the Earth, (for ſhe goes round the Earth, not in a Circle, but at different Diſtances in her Orbit) and conſequently has the *leaſt* apparent Diameter or Breadth poſſible, ſhe does not cover the whole Face of the Sun, but a Ring or bright Circle then appears round the Edge of the Moon, which is therefore call'd an *annular Eclipſe* of the Sun. But if the Moon happens to come *directly* between the Earth and Sun, when ſhe is at the *leaſt* Diſtance from the Earth, ſhe appears then ſo large, as to cover the Sun's whole Face, it is called a Central or total Eclipſe, and thereby cauſes Darkneſs for ſome Minutes.

ECLIPSES of the MOON.

When the Earth comes nearly or exactly between the Sun and the Moon, the Earth's *conical* Shadow is projected on the Moon's Body, and involves her in it, *partly* or *wholly*, (happening always at *Full-Moon*) when her Face is *partly* or *wholly* obſcur'd, and is therefore call'd a partial or total Eclipſe of the Moon. The Earth being a Body thirty or forty Times larger than the Moon, (being as the Cubes of their Diameters) caſts a Shadow large enough to eclipſe the Moon, at her Diſtance, if her Diameter were 3 Times more than it is; whereas the Shadow of the Moon thrown upon the Earth, is never large enough to eclipſe it's whole Surface, or Face together; but the *Moon's Shadow* firſt lights upon ſome particular Part of the Earth, and then travels at a certain Rate of Swiftneſs over different Parts of its Surface, during the Continuance of an Eclipſe of the Sun; to whoſe Inhabitants only that Eclipſe of the Sun is ſeen. And therefore Eclipſes of the Sun are not ſeen in all Parts of the Earth, (or rather all Parts of the Earth are not eclipſed) even in the Day: For where the Moon's *Shadow* does not come there can be no Eclipſe of the Sun. And if the Conjunction of the *Sun* and *Moon* happens in the Night, no Eclipſe of the Sun can be viſible to ſuch Inhabitants.

If the Moon revolved round the Earth in the ſame Plane as the Earth does round the Sun, there would be *conſtantly* an Eclipſe of the Sun at every *New Moon*, and of the Moon, at every *Full-Moon*. But, to prevent this Inconvenience, the Author of Nature has contrived that the Courſe of the Moon round the Earth is ſometimes above and ſometimes below the Courſe of the Earth, round the Sun, whereby their Shadows generally miſs falling upon one another.

Theſe Motions of the *Earth* and *Moon* are ſo exactly regulate
and known by a Courſe of long Obſervation, that Aſtronome
can foretell the Times of all the Eclipſes of *Sun* or *Moon*, th
will happen for many Hundred Years to come, within a few Minutes; than which there cannot be a more *remarkable Inſtance*
the human *Sagacity* in diſcovering the Truth of the Works
God; or the Laws by which the vaſt Bodies in our *Syſtem* cont
nue to move in their Orbits.

It is certain from Obſervation made with the beſt *Teleſcope*
that though the Face of the Moon is cover'd with numerous *In*
qualities, like the Mountains and Valleys upon our Earth, y
there are no great Collection of Waters upon it like our Seas
Oceans; nor is there any Reaſon, from the Appearance of h
Face through the beſt Glaſſes, to conclude ſhe has any ſuch A
moſphere as attends our Earth.

If the Moon is inhabited (and it is probable ſhe is) with ſuitab
Inhabitants, thoſe who live on one Side or Hemiſphere can nev
ſee our World, and thoſe who live on the contrary Side, of th
Moon, never loſe Sight of us; except when the Earth comes between them and the Sun; as the Moon keeps always the ſa
Side turn'd towards us.

Thoſe Inhabitants of the Moon who live about the midd
Part of her Hemiſphere, next the Earth, muſt ſee it always d
rectly over their Heads, with much the ſame Appearance as th
Moon makes to us; ſometimes horn'd, ſometimes halfed, a
ſometimes *fully* illuminated, and alſo gibbous, but about thirt
times larger than our Moon.

The Moon's *Attraction* acting more effectually on the *fluid* th
ſolid Parts of our *terraqueous* Globe, in Conjuction with the Sun
Attraction, are the Sole Cauſes of our Tides, in all their Vari
of Circumſtances; as Sir *Iſaac Newton* has demonſtrated.

☞ There are other Properties of the Moon, concerning h
Seaſons, Length of her Year, *Longitude* of her *Places* eaſy diſco
able, &c.

OF MARS.

IV. Mars, at the Diſtance of 123 *Millions* of Miles, goes ro
the Sun, in one Year, 321 *Days*, 22 *Hours*, and about 18 M
nutes of our Time; but (by the Earth moving the while) he r
turns not in Conjunction with the Sun 'till 2 Years, 49 D
22 Hours, and about 29 Minutes, according to the Differenc
Motion of the *Earth* and *Mars*: He travels at the Rate of
Miles *per Minute* forward in his Orbit, turning the Inhabit
at his Equator about 9 ¼ Miles *per* Minute round his *Axis*.
Quantity of Light and Heat is about one half as much as o
and the Sun appears to his Inhabitants but half as big as t
This *Planet* is reckon'd conſiderably leſs than our Earth (*but*
much leſs is not exactly determin'd) and if any Moon attends it,

ſt be very ſmall, and is not yet diſcover'd. His *Aſpect* is of a dy Colour, or fiery red; and by his *Appulſes* to certain *fix'd Stars*, ſeems to be ſurrounded with a very groſs Atmoſphere. He is ſometimes *gibbous*, but never horned; proving that his Or- includes that of the Earth, and that he ſhines by a borrow'd ght.

Our *Earth* and *Moon* appears to the Inhabitants of *Mars*, like Moons, a bigger and leſs; changing their Places with each er; and are ſeen ſometimes horn'd, and ſometimes half, or ee Quarters illuminated, but never *Full*. And their Diſtance nder of 240 Thouſand *Miles*, dwindles to an Angle of about Quarter of a *Degree*, or half the Moon's Breadth; under which y are ſeen ſubtended from *Mars*. To whoſe Inhabitants our rth appears almoſt as big as *Venus* appears to us, and is never n above 48 *Degrees* from the Sun.

From *Mars* the Earth appears to paſs over the Sun's Face, as likewiſe *Mercury* and *Venus*. But *Mercury* cannot be ſeen from ars by ſuch Eyes as ours, unleſs aſſiſted by proper Teleſcopes; ept when he paſſes over the Sun's Face. And *Venus* will be as dom ſeen as *Mercury*.

Jupiter and *Saturn* are as viſible to the Inhabitants of *Mars*, as y are to us. The *Axis* of *Mars* is nearly perpendicular, and his bit 2 *Degrees* inclin'd, to the Earth's Orbit, or Ecliptic. The rth and Moon will appear from *Mars* much larger ſometimes n at others, as *Mars* appears to us; the Diſtance between us one Part of the Revolution being 5 or 6 Times leſs than at the rt oppoſite.

OF JUPITER.

V. JUPITER is the largeſt of all the planetary Bodies, mo- ng round the Sun in an Orbit ſuperior to that of *Mars*, in e Period of 11 *Years* 313 *Days* 8 *Hours* and about 35 *Minutes*; t being the ſwifter Body, (the Earth moving the while) he turns in Conjunction with the Sun in 1 *Year* 33 *Days* 21 urs and about 16 *Minutes*; according to the Difference of the otions of the *Earth* and *Jupiter*.

Jupiter is about 424 *Millions* of Miles from the *Sun*, who oves at the *Rate* of 425 Miles *per* Minute forward in his Or- t, and turns his Inhabitants at the Equator about 432 Miles und his *Axis* in 1 Minute; his Rotation being ſwifter than s Progreſſion.

He is above 1000 Times bigger than our Earth; his Circum- ence being 254 *Thouſand* and about 470 Miles, or more than Times the Earth's Circumference.

He turns round his *Axis* in 9 *Hours* 56 *Minutes*; being the ngth of his Day and Night in our Time.

His Orbit is plainly without the Earth's Orbit; becauſe he ſeen in *Oppoſition* to the Sun; and always with a full illuminated Face. And his diurnal Revolution is very viſible, b remarkable *Spot* on his Face.

JUPITER'S BELTS.

Jupiter is ſurrounded with what are called *Belts*, being Subſtances, putting on many Changes; on which Account are deem'd to be *Clouds*; ſome of which being interrupted broken, have entirely vaniſhed. They ſometimes appear different Breadths, and then become nearly of the ſame Bread Large *Spots* are ſeen in theſe *Belts*; and, at the vaniſhing *Belt*, the contiguous Spots diſappear alſo.

The *Axis* of *Jupiter* is ſo little different from being perp dicular to his Orbit, that he undergoes very little Change Seaſons. If his *Axis* had conſiderably inclin'd, then as m Degrees round the Pole, as were equal to that Inclinat would, by Turns, have been dark for about 6 of our Ye And ſince each Degree contains about 706 of our Miles, mean Quantity, vaſt Tracts of his Surface muſt have rendered uninhabitable, by a large Inclination of his Axis the Ecliptic, (otherwiſe ordered by the Creator) and the ſo, as none of his 4 *Moons* are ſeen from his Regions about Poles; unleſs by means of *Refraction*.

From *Jupiter*, the Sun appears about 1 *twenty eighth* as big as he appears to us; and his Light and Heat are dimin ed in the ſame Proportion: But this Defect of Light is gr ſupplied by 4 Moons (bigger and leſs than our Earth) g about him; that there is hardly a Part of this Planet, what is enlightened by more or leſs of theſe Moons; ex at his *Poles*; where their Light is not wanted; becauſe Sun *conſtantly* appears in or near their Horizon, and may be at both the *Poles* by the Refraction of his vaſt Atmoſphere.

OF JUPITER'S MOONS.

Jupiter is attended with 4 *Moons* going round him, in diff ent Periods of Time.

The *Firſt* or neareſt Moon goes round him in about 1 D 18 Hours and 28 Minutes of our Time; at the Diſtance of times *Jupiter*'s half Thickneſs from his Center, or 230 Th ſand Miles.

The *Second* Moon goes round *Jupiter* in 3 Days 13 Hours about 19 *Minutes*, at the Diſtance of 9 times his half-Thick neſs, or 365 Thouſand Miles.

The *Third* goes round *Jupiter* in 7 Days and 4 Hours, at Diſtance of 14,38 Times his *Radius*, or half-Thickneſs, *Thouſand* Miles.

The *Fourth* goes round *Jupiter*, in 16 Days 18 Hours about 5 Minutes, at the Diſtance of 25,3 Times his *Radius*, Half-Thickneſs, or 1 *Million* of Miles.

Jupiter ſeen from his neareſt Moon appears 1000 times larger than our Moon, in all her monthly Shapes, every 42½ Hours.

Theſe *Moons* are eclipſed by *Jupiter*'s Shadow in every Revolution they make; by which Eclipſes Aſtronomers have diſcovered that Light comes from the Sun to us in 8 *Min.* 13 *Sec.* of our Time, who have, by thoſe Eclipſes, determined the Longitudes of Places on our Earth with greater Certainty and Accuracy than by any other Method.

Jupiter's Orbit is inclin'd to the *Ecliptic* 1 Degree 20 Minutes. His Aſcending *Node* is in 8 Degrees of *Cancer*; and Deſcending One in as much in *Capricorn*, in 1760 Beginning; and the Quantity of Light afforded to *Jupiter*, is about 1 *twenty-eighth* Part of what is afforded to us; except what Light is increaſed by his 4 *Moons*, from Reflection. Though it is certain, that the Revolutions of all *Jupiter*'s Moons are, in Reality, ſo equable, that a *careful Obſerver* of them may exactly *foretel* the Minute when any one of them will be hid behind *Jupiter*'s Body, or paſs betwixt us and his Body: yet, when the Earth is in the Part of her Orbit, the furtheſt from *Jupiter*, it is always found, that thoſe Eclipſes of his Moons happen conſiderably later than the true Time of *Occultation*; occaſioned by the Light taking up ſo many more Minutes in its Paſſage from *Jupiter* to us, at his *furtheſt* than at his *neareſt* Diſtance. *Aſtronomers* finding that *Light* is about 7 or 8 Minutes in its Paſſage from the *Sun* to our Earth, being after the *Rate* of above ten Millions of Miles in a Minute, or about 50 or 60 Thouſand Miles, while you can pronounce the Word *Light*; therefore if a Cannon-Ball continued to move at the Rate of 8 Miles per Minute, it would ſpend about 19 Years and a Quarter, in coming from the Sun to us; and a Body only moving with the Swiftneſs of a *Horſe* or a *Ship*, would take up as many *Ages* in paſſing over the like Space.

☞ *It is by the Difference of the Time of ſeeing the Eclipſes of* Jupiter's *Moons at different Parts of the Earth, that the Difference of Longitude of thoſe Places are determined: For which Purpoſe we have inſerted the Times of thoſe Eclipſes, happening at* Greenwich-Obſervatory, *in Tables further on, computed from a* correct Theory, *for the Uſe of Navigators, in obſerving thoſe Eclipſes under a diſtant Meridian, at Sea, by means of a new invented* Chair, *ſuſpended perpendicularly in the Ship, from which to take Obſervation, without the Obſerver being affected by the Ship's Motion.*

Such a Chair, we are told, (beſides that compleated by Mr. *Irwin*) is about compleating at Mr. *Siſſon*'s, in the *Strand*, *London*.

Of Saturn.

VI. Saturn, the *remoteſt* of all the Planetary *Bodies* in our *Syſtem*, at the Diſtance of about 777 *Millions* of Miles from the Sun, goes round him in 29 Years 158 Days 13 Hours and about 15 Minutes; but (the Earth, the *ſwifter* Body, moving the while) he returns in *Conjunction* with the Sun in 1 *Year* 13 *Days* 2 *Hours* and about 6 *Minutes*, according to the Difference of Motion of the *Earth* and *Saturn*. He travels at the Rate of 315 Miles in a Minute, alo his Orbit; but his Motion *per* Minute round his *Axis* is unknow He is about 600 Times bigger than our Earth, and is ſurrounded by thin broad Ring, as a Globe is ſurrounded by its Horizon; appear *double* thro' a *Teleſcope*. It is inclin'd about 30 *Degrees* to the Earth Ecliptic and is about 21 *Thouſand* Miles in Breadth; being equal it's Diſtance from *Saturn*, every where.

This amazing *Ring*, whether a Diſruption from *Saturn*'s Bo or original Appendage, appears to turn round its *Axis*; becau when it is edgewiſe to us, it is ſeen thicker on one Side of *Sat* than on the other; and the thickeſt Edge has been ſeen, at differe Times, on different Sides thereof. This *Ring* diſappears twice every annual Revolution of *Saturn*, *viz.* when he is in about Degrees of *Piſces* and *Virgo*, when the Edge is turn'd towards u and appears broadeſt when *Saturn* is in the Middle, between th two *Points*. By which *Saturn* has no viſible Spots on his Body, determine the Time of his *Rotation*, or Length of his Days a Nights, which are unknown to us.

The *Inclination* of his Orbit to the Ecliptic is about 2½ *Degr* and his North *Node* in about 21 Degrees 23 Minutes of *Cancer*, a South *Node* as much in *Capricorn* in 1760, beginning; being but abo 13 *Degrees* from the *Nodes* of *Jupiter*.

The Light and Heat afforded by the Sun to this *Planet* is about th *ninetieth* Part of what our Earth enjoys; but by the Reflection Light from his *Ring*, as well as from his 5 Moons, attending hi his Light is greatly encreaſed, as appears by his *Splendor* in the Nigh And the Soil of this *Planet* may contribute to the Encreaſe of He by its Retention thereof; tho' at ſo vaſt a Diſtance from the Su The Inhabitants of *Saturn* may be ſo adapted to his Climate, to receive Enjoyments, or Happineſs in this their remote Situatio to whom the Sun muſt appear, if their Eyes are like ours, 100 ti leſs than to us; or about twice as big as *Venus* appears, when ſhe at the brighteſt.

The warmeſt *Region* in this Planet muſt be colder than in *Gr* *land*, if there is no Proviſion for encreaſing it, at that Diſtance fro the Sun. If our Earth was ſo remotely ſituated as *Saturn*, all Fluids upon it muſt be turn'd to *Ice*, as they are under our Pole without a Poſſibility of ever returning to their original State, but the Means of Fire.

Neither *Mercury*, *Venus*, the *Earth*, *Moon*, or *Mars* can be ſe from *Saturn* by ſuch Eyes as ours, without the Aſſiſtance of Glaſſe only *Jupiter* and the *Sun* can be beheld from *Saturn*; and only *Sa* and the *Sun* from *Jupiter*, with the naked Eye.

OF SATURN'S FIVE MOONS.

The 5 MOONS conſtantly going round *Saturn* to encreaſe his Ligh perform their Revolutions as follow.

The *Firſt Moon* goes round *Saturn* in 1 Day 21 Hours and ab 18 Minutes, at the Diſtance of about 140 *Thouſand* Miles from h Center.

Th

The *Second Moon* goes round him in 2 Days 17 Hours and abou 1 Minutes, at the Diſtance of about 187 *Thouſand* Miles.

The *Third*, in 4 Days 12 Hours and about 25 Minutes, at the iſtance of 263 *Thouſand* Miles.

The *Fourth*, in 15 Days 22 Hours and about 41 Minutes, at the iſtance of 600 *Thouſand* Miles.

The *Fifth*, or outermoſt, in 79 Days 7 Hours and about 5 Minutes, at 1 Million and about 800 *Thouſand* Miles Diſtance om *Saturn*'s Center.

The *Attendance* of theſe 5, and the former 4 Moons, on their ſpective great Bodies of *Saturn* and *Jupiter*, are Indications of oſe Planets being inhabited; or to what Purpoſe ſhould ſo many oons be created to give Light to ſuch vaſt Bodies, if not for the ccommodation of their Inhabitants? And the further that Bodies are aced from the Sun, and conſequently the more they are deprived of s *direct* Light, we find the greater is the Number of their attending oons, to ſupply their Light by Reflection; an Indication of a Proſion for the greater Number of Inhabitants.

By the Earth continuing to move forward in her inferior Orbit, while e ſuperior Planets, of *Mars*, *Jupiter*, and *Saturn*, go forward the ſame ay, in their reſpective Orbits, from Weſt to Eaſt, they will appear as e ſee them, ſometimes *direct*, *ſtationary*, or *retrogade*. Theſe Appearces are a Proof that the Motions of *planetary Bodies* in our ſolar ſtem are as we admit them, according to the *Newtonian* Philoſophy; emplified and confirm'd by an *Orrery*.

The Appearances above mentioned are only ſeen thro' a *Teleſcope*; which you may view the Moon, at 240 *Thouſand* Miles Diſtance, agnified as ſhe would appear to a naked Eye at the Diſtance of 200 iles.

The *Earth*, where an Obſervator of the Heavens is plac'd, being t the Center of our Syſtem of planetary Bodies, they in Conſequence uſt come nearer to, and farther from us, at different Times, by hich Means the *Faces* of our Planets appear *bigger* and *leſs* to us, Turns.

Mercury appears $5\frac{1}{2}$ times bigger at his *leaſt* than at his *greateſt* Diſnce; *Venus* at her leaſt Diſtance, 32 times as big; *Mars* at his, 5 times; *Jupiter* at his, more than twice as big; and *Saturn* only alf as much bigger, at his leaſt, than greateſt Diſtance. But *Venus* d *Mercury* are never ſeen when they are *neareſt* the Earth; except hen they paſs *directly* between the Earth and Sun; which very ldom happens. Hence the *apparent Bulk* of the planetary Bodies our Syſtem is no certain *Rule* to know them by.

OF COMETS.

COMETS, (partly deſcribed in former *Palladiums*) are *ſtupendous* odies, of different *Denſities*, like the *Planets*, revolving round the n, as their common Center, in ſuch very elliptical or eccentric bits, that they never appear to us, but in that Part of their Orbit en they deſcend near the Sun; from whence, after having paſſed

their neareſt Diſtance to him, called the *Peribelion*, with the greateſt V
locity, they aſcend, on the contrary Side of their Orbits, running o
into their furtheſt Diſtances from the Sun, beyond the Orbit of S
turn, where their Motion is hardly ſenſible. Their Orbits, in gen
eral, are acroſs the Heavens, in all Directions; whereas th
planetary Orbits only go from *Weſt* to *Eaſt*; and by the Orbits o
the *Comets* never coinciding with, or going near the Directions o
the *planetary* Orbits, all the *Comets* circulate freely, without givi
Interruption to the *Planets*, or being by them interrupted; except b
deſcending into the Neighbourhood of the Planets with their greate
Velocity; their *mutual Attractions* may a little diſturb each othe
But by the Creator's ballancing and proportioning the two Forces o
Attraction and *Projection*, call'd the *centripetal* and *centrifugal* Fo
ces, the whole *Machine* of our Syſtem (and each Syſtem of th
Univerſe) performs its Motions in regular Order.

That there is an *Attraction* in all material *Subſtances*, ſtrong
or weaker, in a certain Proportion to their Bulk and Diſtanc
from one another, is made evident to Sight; for if you place, i
the Middle of the Surface of a Veſſel full of Water, a Number o
ſmall Pieces of Cork, Wood or other floating *Subſtance*, at ſmall Di
ances from one another, the neareſt in *Bulk* and Diſtance will f
come together, and then the next neareſt; and you will ſee the *larg*
Pieces attract the *ſmaller* more than the ſmaller attract each other; a
by the joint Attraction of the ſeveral Pieces, the largeſt of all w
bring the ſeveral leſs together about it; which largeſt Piece w
further manifeſt the *Virtue* of Attraction in Matter, by drawing th
leſs Pieces after it, if you move it from them.

But the *Projection* of a *Cannon-Ball*, drawn from its rectilin
Motion to a Curve concave towards the Earth, by its *Attracti*
explains, in the moſt familiar Manner, how leſs Bodies, put in ſ
ficient Motion, are made to revolve round the Centers of the gre
er attracting Bodies; for there is Nothing more required to ma
a Body revolve, than to give a ſufficient Impulſe, or Force to make
move forward, with a given Celerity, in a given Time, within th
Influence of an attracting Body. And could a ſufficient Velo
be given to a *Cannon-Ball*, to ballance with the Force of th
Earth's *Attraction*, that neither Force might prevail, the Ball wo
revolve. For we ſee the Motions of all the great Bodies of th
Univerſe, regulated by the too ſimple Principles of *Projection* a
Attraction. Upon theſe *two Principles*, the nearer to, or furth
from the *Centers of Attraction*, the revolving Bodies move, in th
reſpective Orbits, the greater or leſs is their reſpective Velociti
And our Moon, and all the Satellites of *Jupiter* and *Saturn*,
well as their Primaries, are retained in their reſpective Orbits, b
the two Principles aforeſaid. On the contrary, if the Attraction o
prevailed over the projectile Force, or the Centripetal over the Ce
trifugal Power, then all Bodies in this Syſtem would deſcend to th
Sun, as the Source of Attraction. The *Comets* in their va
eccentric Orbits, alſo revolve round this great LUMINAR
turning round him as Racers about their *Goal*.

The *Comets* muſt be of greater *Denſity* than any known Subſta

fu

ſince the *Heat* they undergo, in every Approach they make to the Sun is ſuch as would *melt*, *vitrify*, or *diſſipate* any known Subſtance upon Earth.

The Heat of Bodies computed at a given Diſtance from the Sun, is as the *Square* of thoſe Diſtances inverſely; tho' Sir *Iſaac Newton* computed the Heat of the *Comet* which appeared in 1680, by approaching the Sun, to be 2 *Thouſand* times hotter than a red-hot Iron, and that a Body as big as our Earth (to which Comets are little inferior) thoroughly heated would not cool in leſs than 50 *Thouſand* Years, according to the Experiments he made of heated Iron Balls, of given Diameters, yet we may conclude that *Comets*, in paſſing to and from their *Perihelions*, are never heated but *ſuperficially*, and not to their Centers.

Aſtronomers reckon about 21 *Comets* belonging to our *ſolar Syſtem*, moving in all Sorts of Directions. Thoſe which have been obſerved freely paſſed thro the etherial Regions and the Orbits of the Planets, without ſuffering any Impediment.

The *Periods* of the 3 Comets only are yet determined. The *Firſt*, of 75, and 76 Years, alternately, appearing in 1531, 1607, 1682, and 1758. The *Second*, of 129 Years; appearing in 1532, and 1661, and is expected to appear in 1789. The *Third*, of 575 Years, having laſt appeared in 1680, and may be expected in 2235. This laſt *Comet*, from its Orbit's Dimenſions, is about 11 *Thouſand* two Hundred Millions of Miles from the Sun, at its *greateſt Diſtance*; and at it's *leaſt* Diſtance from the Sun's Center, is within leſs than a third Part of the Sun's Half-Thickneſs, or Semidiameter from his Surface; being about 490 *Thouſand* Miles. In that Part of its Orbit therefore, which is neareſt to the Sun, the *amazing* Velocity of its Motion is not leſs than 14 *Thouſand* 666 Miles in 1 *Minute* of our Time. The Sun, as ſeen from it, appears to be about 100 Degrees in Breadth to ſuch Eyes as ours, and conſequently appears 187 times broader than to us: And, at the greateſt Diſtance of this *Comet* from the *Sun*, where it ſcarcely moves at all, the Sun is *diminiſhed* ſo as to appear from thence but a little brighter and larger than the *Dog-ſtar* appears to us.

The *Comets* all differ from the *Planets* in their *Aſpects*, looking duſky and gloomy, as if ſurrounded with vaſt Atmoſpheres. They project behind them towards that Part of the Heavens oppoſite to the Sun, a *prodigious* miſty Stream or lucid *Vapour*, call'd their *Tails*; ſuppos'd to be the Atmoſphere of the Comet, rarified to a great Degree, in its Approach to the Sun; enlarging and diminiſhing its Dimenſions as the Comet approaches to, and recedes from its Perihelion, or *neareſt Diſtance* to the Sun. The *Tail* of the Comet of 1680, extended itſelf over 60 Degrees, or a *third Part* of the Heavens, from *Eaſt* to *Weſt*, which Tail therefore muſt be ſome *Millions* of Miles in Length.

As to the *Deſtination* or Purpoſe of Comets, whether they were Worlds formerly inhabited, and reduced to a *Chaos*, or whether they are future Worlds not yet reduc'd to a habitable State, or whether they are Maſſes of Combuſtible Matter made to move *periodically* round the Sun, for the Conveyance of *Heat* and *Light* to remote and dark Regions, and after a Number of Revolutions, (approaching every Revolution nearer and nearer, as it is ſuppoſed ſome of them do) they at laſt drop into the

Sun, to ſupply his exhauſted *Fuel*, and continual Waſte of his Heat and Light; or whether they are deſigned to impregnate the Regions of the *Planets* with ſalutary *Particles*, and make up the Decay or Waſte of thoſe Elementary Principles; or whether they are form'd to bring about *Deluges* or *Conflagrations*, or to put a Period to, or produce a Change in other Worlds, is not eaſy to determine. But the *extreme* Viciſſitudes the *Comet Inhabitants* undergo, of Heat and Cold, (and ſuch thoſe Inhabitants may be adapted to endure) with the Opportunity they have of ſeeing the Works of Creation in ſuch Variety of *Views*, and Appearances (in travelling from the fartheſt to the *neareſt* Part of their Orbits in reſpect to the Sun) muſt be as aſtoniſhing as unſpeakably magnificent!

Some Comets, and particularly that of 1680, are computed to proceed in their greateſt Diſtances from the Sun, no leſs than 4 Times the Diſtance of *Saturn*. Yet 'tis found that Comets at that amazing Diſtance, in the *etherial* Pace, are not affected by the Attraction of the *fix'd Stars*; but arriving at their *Extreme Limits*, to which their projectile-Force will carry them, they regularly return, by the Force of the Sun's Attraction, acquiring new projectile Force, by accelerating their Velocities all the Way back in their Approach to the Sun; and then retard their Motion in their Retreat every where from Him; and ſo on *periodically*, and perpetually.

We may therefore obſerve, that there is a Space, of 6 or 7 *Thouſand* Millions of Miles over, at leaſt, (and who can tell how much more?) wherein the *Planets* and Comets revolve round the Sun, at the Center of that Space, independent of the Attraction of the *fix'd Stars*, reaching in all Probability, like our Sun's Attraction, 3 or 4 Thouſand Millions of Miles, round each Star. And we may reaſonably ſuppoſe, that there are infinite Syſtems in the infinite Space, and a *fix'd Star* plac'd in the Midſt of each Syſtem, as a *Sun*, to the reſpective revolving Bodies; and all theſe Syſtems kept in Suſpenſion, and at due Diſtances from each other, by certain PROPERTIES.

HENCE, we may ſuppoſe that no two *fix'd Stars* are nearer to each other than 6 *Thouſand Millions* of Miles, however they appear to us ſo crowded, and near one another, at their vaſt Diſtance. For though we are nearer ſome of them at one Time of the Year than another, by the whole Breadth of the Earth's Orbit, or about 160 *Millions* of Miles, their *Appearances*, *Magnitudes*, and *Diſtances*, from one another, are ſeen to be always the ſame.

And, if the Diſtance of 160 *Millions* of Miles is allowed to bear no greater Proportion to the Diſtance of the *fix'd Stars* than one *Pace* or Yard does to *ten* Miles, they may be plac'd, on this Suppoſition, at no leſs Diſtance from us than 10 *Thouſand* Times the Breadth of the Earth's Orbit; that is, 1,600,000,000,000, Miles; making *one Thouſand Times one Thouſand Millions*, beſides 6 *Hundred Thouſand Millions* of Miles.

And, if we further conſider the *immenſe* Diſtance of the *fix'd Stars*, and their Magnitude, to be viſible to us at that Diſtance, it cannot *rationally* be ſuppoſed, that ſuch a Profuſion of *Luminaries* were created by the Divine Wiſdom (that does Nothing in vain) only to afford us a glimmering Light in the Night; which had been more *effectually* be-ſtow'd, and with infinitely leſs Exertion of creating Power, by the Addition of one *Moon*. Therefore, in all Probability, or rather without all Doubt, theſe *ſtupendous Luminaries*, ſtrew'd all over the infinite Expanſe, were purpoſely created to enlighten *innumerable Syſtems* of Worlds, revolving round them, as our Earth, and the other Planets, revolve round the Sun. And, if every one of the *fix'd Stars* is a Sun to a *New Syſtem* of revolving Bodies, it is probable that each of thoſe *Syſtems* take up nearly as much Space as our Syſtem: For, why ſhould we ſuppoſe a greater Space allow'd to our Syſtem than to Others, or more Space than is neceſſary?

And, as to the Number of *fix'd Stars* viſible to the naked Eye, amounting but to about 3 *Thouſand* in the lateſt *Catalogues*, on all Sides of the Heavens, if we have Recourſes to *Teleſcopes*, the Number of the Stars will become next to infinite: for we diſcover a greater or leſs Number in each *Conſtellation*, according as the *Teleſcope* we uſe for that Purpoſe, magnifies a greater or leſs Number of Times.

In the *Pleiades*, or ſeven Stars, large *Teleſcopes* diſcover 3 or 4 Score; in *Orion*, where the naked Eye diſcovers not above 40 or 50, an excellent *Teleſcope* will diſcover 2 *Thouſand*. In the Conſtellation of *Perſeus*, there are more Stars to be ſeen with a Teleſcope than with the naked Eye in the *whole Heavens*.

In the *Galaxy*, or Milky Way, encircling the whole Concave of the Heavens, for the Breadth of ſeveral Degrees, it is probable the Number of Stars are immenſe. Whoſe blended Light cauſes ſuch Confuſion of Brightneſs, in that Part of the Heavens, and being at ſo vaſt a Diſtance, no ſingle Star can be diſtinguiſh'd: as *Milton* deſcribes it, this Part of the Heavens is *powder'd with Stars*.

And hence the Different Magnitudes of Stars, as they appear to us, are probably owing to their vaſtly different Diſtances, they are from us, as plac'd in the Heavens; from thoſe appearing the largeſt, the moſt near, to thoſe appearing the ſmalleſt, the moſt remote.

And, if each remote Star, of thoſe innumerable *Myriads* of Luminaries, be (*as 'tis probable*) a Sun, giving Light and Heat to a different Syſtem of *Planets*, *Moons*, and *Comets* going round it; and if all thoſe Planets and Moons be Worlds inhabited by various Orders of Beings, enjoying ſuch Degrees of Happineſs as the Creator of all theſe Worlds has there reſpectively prepar'd for them, we have thence an aſtoniſhing Idea of the Greatneſs of the Creator from his Works.

The Idea of the immenſe THEATRE OF THE UNIVERSE exhibits to us its Fitneſs for the Being of an infinite GOD, (whoſe Exiſtence and Glory exceeds all human Comprehenſion) to diſplay his immenſe Wiſdom, Power, and Goodneſs upon.

But, after having extended the *created Univerſe* to a Space, as far and wide as the greateſt human *Arithmetic* can expreſs, what is that Space to *Infinitude*? but as a mere Point, that bears no Proportion to the unbounded and unlimited Preſence of the Divine Nature? For were the higheſt Archangel to take his Flight from this Part of the Univerſe, and travel in a direct Courſe with the Swiftneſs of *Light*, it is certain, from the Nature of Immenſity, that ſhould he proceed in his Flight to all *Eternity*, he muſt ſtill find himſelf in the Center of the Divine Preſence,

" *In whom we live and move and have our Being. There is no flying from*
" *his Preſence. The Heavens, even the Heaven of Heavens cannot contain*
" *him.*"

☞ The foregoing Syſtem of the World, is not a late or New Invention, but was taught by the famous *Samian* Philoſopher, *Pythagoras*, and other Antients. It was however loſt in the latter Ages of Ignorance 'till the 15th *Century*, when it was reviv'd by the famous *Poliſh* Philoſopher, *Nicolaus Copernicus*, who was born at *Thorn*, in the Year 1473. He was followed by the famous *Kepler*, *Galileo*, *Deſcartes*, *Gaſſendus*, and the ſagacious Sir *Iſaac Newton*. Which laſt great Genius has eſtabliſhed the foregoing Syſtem of Motion, on the everlaſting *Baſis* of mechanical Experiment, and *Mathematical Demonſtration*. Other Syſtems have been invented ſince the *Pythagorean*; as the *Ptolemean* firſt, and then the *Tychonic*; neither of which are worth the *Explanation*, ſince the latter is but partly true, and the former wholly *abſurd*.

OF THE

WISDOM of GOD

IN HIS

MINUTE WORKS of CREATION.

THE CONTRAST.

THE *Microſcope* has open'd to us of theſe latter Ages, a World quite unknown to the *Antients*, who imagined that the whole Race of *Inſects* were produc'd by *Heat* and *Corruption*, and had not the leaſt Suſpicion of the Exiſtence of any living Creature ſmaller than their naked Eyes could perceive. Whereas we find, by the Help of the *Microſcope*, (furniſhing us with an inexhauſtible Variety of Entertainment) that the ſmalleſt *Animalcule*, as well as the largeſt Beaſt of the Field, is produc'd by Parent Animals; and that the different *Species* or Kinds of Living Creatures, whoſe Minuteneſs renders them imperceptible to our naked Eyes, are as numerous as thoſe which are viſible to us, without Glaſſes. By the *Microſcope* we find that the complex and various *Apparatus*, neceſſary to Life, can be crowded into a *Point*; and that an *organiz'd* Body may be put together, whoſe Size is not equal to an *Atom*; and, moreover, that there are innumerable Species of *Animalcules*, which, when magnified a Million of Times, are ſtill hardly diſcernible; that a few Drops of ſome Fluids contain more living Creatures than there are *Men*, *Women* and *Children*, now alive, upon the Face of the whole Earth. And, by the *Microſcope*, we find, that the ſame Hand which, with ſuch wonderful Accuracy, poiſed and ballanced the *Magnitudes*, *Diſtances*, and *Velocities* of thoſe immenſe Bodies, the Planets and Comets, h likewiſe faſhion'd the inconceivably Minute Bodies of *Animalcules*, with ſuch Elegance and Beauty, that the more they are magnified, and the farther they are examin'd, the more curious they are found to be: Whereas, on the contrary, the moſt *exquiſite Works* of human Art owe their Beauty to the Imperfection of our Sight. So that the *fineſt Needle* appears through the *Microſcope* like a Plowſhare; a *Piece of Silk* like a Mat; and the moſt delicate *Picture* in Miniature, like a rough *Caſt-Wall.*

The Obſervations of the Wonders of creating Power, in theſe Minute Objects, ſhew us, that He, who inhabits Immenſity and Eternity, is abſolute Maſter of every Point of Space, and of every Particle of Matter in the Univerſe; and *pervades*, *actuates* and *invigorates* all; exhibiting, in an imperceptible Point, as well as in an unbounded Sphere, the Perfections and Attributes of an *infinite God.*

How conſpicuous is the Wiſdom of God, in the Miniature of his Works! There are very few Subſtances in which the *Microſcope* does not diſcover ſomething curious and unexpected. But, for the Satisfaction of ſuch Readers as are unacquainted with the Uſe of that *Inſtrument*, we ſhall here ſet down *Inſtances* of the moſt remarkable and entertaining *Objects*, on which Microſcopic Obſervations have been made.

INSTANCES of the WONDERS of MINUTE OBJECTS.

I. THE *Globules of the Blood, which are computed to be almoſt a two Thouſandth Part of an Inch in Diameter, each conſiſting of* 6 *ſmall Globules, each of which again probably conſiſts of* 6 *ſmaller, and ſo on. The Circulation of the Blood may be ſeen diſtinctly, by Means of the Microſcope, in the Tail of a Fiſh, the Web of the Foot of a Frog,* &c. *and the Globules to ſplit and divide, before they can enter the ſmalleſt Veſſels.*

II. *The Bones of all Creatures, ſlic'd extremely thin, afford an entertaining Object for the Microſcope, conſiſting of innumerable Perforations,* and *Ramifications, diſpos'd in an endleſs Variety of Forms.*

III. *The Fleſh of all Land and Sea Animals, dried and cut into very thin Slices, give a beautiful View of the various Fibres and their Convolutions. The Brain, the Spinal Marrow, and even the Hairs of Animals, exhibit different Curioſities.*

IV. *The human Skin, by the Help of the Microſcope, is found to be cover'd over with an infinite Number of Scales lying over one another, as in Fiſhes; and it is probably the ſame in other Animals. It has been computed that a Grain of Sand will cover two Hundred of theſe Scales.*

V. *All Sorts of Feathers, eſpecially thoſe of the Peacock, afford a ſurprizing View through a Microſcope. It is ſuppoſed that a ſingle Feather contains no leſs than a Million of different Parts.*

VI. *Flies are found by the Microſcope to be produc'd from Eggs laid by the Mothers: from whence they are hatch'd in the Form of Maggots, or ſmall Worms, which are afterwards transformed into Aurelias, and theſe into perfect Flies. This is the Proceſs moſt of the winged Inſects go through in their Production. They have a great Number of Eyes fix'd to their Heads, ſo that they ſee on all Sides around them, without turning their Heads or Eyes. A common Fly is ſuppoſed to have eight Thouſand; and a grey Drone Fly no* *leſs than fourteen Thouſand Eyes, with a diſtinct Optic Nerve to each; an each Eye appears through the Microſcope, though magnified many Hundre Thouſand Times, more exactly ſhaped, and more curiouſly poliſh'd, than hu man Art could finiſh an Object, as large as the whole Cluſter; containing ſ [illegible] Thouſand diſtinct Eyes. The Wings of Flies, eſpecially of the Moth and Butterfly kind, are found to be contrived with admirable Art, to an ſwer their Uſe, and with admirable Beauty and Ornament. The Duſ which ſticks to the fingers, when we handle them, is found to be Feathers each of which has its Quill, and Vane Parts as compleat as that of a Fow or Gooſe; and are inſerted in the Film of the Wing, with the utmoſt R gularity of Arrangement. With the Microſcope the Stings of Moths an Bees appear to be Inſtruments finiſh'd to the higheſt Perfection; their Point and ſaw-like Teeth, being perfectly poliſhed and ſharp; whereas the Edg of a Razor appears like a Butcher's Cleaver; and the Point of a Launc like an Iron Spike, juſt come from the Anvil.*

VII. *By the Help of the Microſcope, the innumerable, and inconceivabl minute Animalcules in various Fluids, are diſcover'd; of the Exiſtence which we have no Reaſon to ſuppoſe any Mortal had the leaſt Suſpicion t the laſt Century. In the Milt of a ſingle Cod-Fiſh ten times more living Cre tures are contain'd than all the Inhabitants of Europe, Aſia, Africa and A merica; ſuppoſing that all Parts of the World are as well peopled as Hollan which is not the Caſe. Of a certain Species, ſome are diſcover'd ſo extremel minute, that it has been computed that three Millions of them, or three tim the Number of Inhabitants of London and Weſtminſter, would not equal th Bulk of a Grain of Sand. Of Animalcules, ſome Species reſemble Tadpol Serpents, or Eels, others are of a roundiſh, or oval Form; others of ve curiouſly turn'd, and various Shapes. But, in general, they are extrem vigorous and lively, and almoſt conſtantly in Motion. Animalcules are to b found (beſides thoſe in the Bodies of Animals,) in the Infuſions of Pepp Senna, Pinks, Roſes, Jeſſamin, Tea, Raſberry Stalks, Fennel, Sage, Me lons, Sour Grapes, Wheat, Hay, Straw, and almoſt all vegetable Subſta ces, in the Water; that is, in the Shells of Oyſters, Cockles, and other Sh Fiſh. In the Foulneſs upon our Teeth, and thoſe of other Animals; in ou Skins, when affected with certain Diſeaſes; in Vinegar and Paſte; a ſo on infinitely. In each of theſe Subſtances, when expoſed in the Air, ſo Time, Multitudes of living Creatures, beyond the reach of Numbers, are di cover'd, of which many Hundreds of Species are already known, as differ from one another, as thoſe of the largeſt Animals; and very probably, th are many more yet unknown. And ſo it is certain, that in the forementio Fluids, few or no Animalcules are to be found when cover'd from the A but when open to the Acceſs of Air, their Numbers are beyond reckonin Therefore it is hardly to be doubted but either the Air is replete with infi Multitudes of living Creatures, too ſmall for Sight, which come and dep their Eggs in Places proper for the Nutrition of their Young, or that th Eggs are floating, every where in the Air, and falling promiſcuouſly ev where, only thoſe are hatch'd, or come to Perfection, which fall upon Pla fitted for them; and the others periſh. However it be, the countleſs Nu bers of thoſe living Creatures, the Profuſion of Life every where to be obſe ed, is above meaſure aſtoniſhing; and ſhews the Maker to be an infi Being.*

VII

VIII. *By the Help of the Microſcope, we find that the Scales of almoſt every different Fiſh are different from thoſe of others, in internal Texture; and that all of them are wrought with ſurprizing Art and Beauty.*

IX. *By Means of this noble Inſtrument, we find, that the Seeds of almoſt all manner of Vegetables contain in them the Stamina of the future Plant, or Tree, and that their Production from the Seed, and their Growth to Maturity, is only the ſwelling and enlarging of the Stamina, by the Addition of nutricious Juice. It is probable the manner of Production and Growth of Animals is analagous to this. The Fertility of ſome Plants is almoſt beyond Belief. One Plant particularly is ſaid, by Naturaliſts, to produce, annually, a Million of Seeds from one. The Farina of Flowers is found, by the Help of the Microſcope, to be a regular organiz'd Body; and not a mere Duſt, as it appears to the naked Eye; and is reaſonably ſuppoſed to be neceſſary to Fertility, in Plants and Trees.*

X. *By the* Microſcope *have been diſcovered many ſingular Properties of that* moſt unnacountable of all Creatures, *the* Polype, *which is found at the Bottom of Ditches, and ſtanding Water; whoſe Manner of* Production, Feeding, *and* Digeſtion, *are different from thoſe of all other Animals. The* young *Ones come out of the Sides of the old, like Buds and Branches from Trees, and at length drop off perfect* Polypes. *They do not ſeem to be of different Sexes; they take in* Worms *and other Subſtance, by Means of a Set of long Arms, or* Antennæ, *which ſurround their Mouths, and after keeping them ſome Time in their Stomachs, throw them out again the ſame Way. The Animal's Body conſiſts of a ſingle Cavity, like a* Tube or Gut; *and what is wonderful, and almoſt beyond Belief, is, that it will live and feed after it is turn'd Inſide out; and even when cut into a great many Pieces, each ſeveral becoming a complete* Polype. *They are infeſted with a Kind of Vermin, as are almoſt all Animals, from the largeſt down to* Bees, *and other Inſects. Theſe Vermin ſometimes in a long Time, will eat up the* Head, *and Part of the* Body *of a* Polype, *after which if it be cleared of them, the devour'd Part will grow up again, and become as complete as ever. Some* Polypes *have, around their Mouths, a Sort of Plume, which they whirl round, and making with it an* Eddy, *in the Water, draw in their* Prey, *and devour it.*

XI. *By the* Microſcope, *it is found, that neither the* Wood, *the* Bark, *the* Root, *the* Leaves, *the* Fruit, *nor even the* Pith *of the meaneſt Vegetable is a Maſs of crude or undigeſted Matter; but that every different* Species *is different in its internal Structure, and all curiouſly and delicately wrought. A Bit of* Cork *cut extremely thin, a Slice of* Oak *or* Fir, *or a Bit of* Elder Pith, *in the* Microſcope, *are ſo many curious Pieces of* Moſaick *Work. Even a Bit of* Charcoal *or burnt Wood, appears thro' the* Microſcope *an admirable Object.*

XII. *By this* Inſtrument, *it is found, that what we call* Mouldineſs *upon* Fleſh, Leather, *or other Subſtances, is no other than a great Number of extremely ſmall, but perfect Plants; having Stalks and Tops like Muſhrooms; and ſometimes an Appearance of* Leaves. *The Seeds of theſe minute* Plants *muſt, in all Probability, be diffus'd,* univerſally, *thro' the Air, and falling upon a Subſtance fit for their Growth, ſpring up in aſtoniſhing Profuſion. There is, in ſhort, no End of* microſcopic Ob*jects. A Sprig of* Moſs, *by the Help of that* Inſtrument, *is found to be* *a regular* Plant, *conſiſting of a* Root, *a* Stock, Branches, Leaves, &c. *And* Naturaliſts *tell us, there are ſome Hundreds of different* Species *of it. A Bit of* Spunge *viewed by the* Microſcope, *appears to be a curious Piece of Work. Every different* chemical Salt *has its Parts differently figured. A Leaf of a common* ſtinging Nettle, *the Beard of a* wild Oat, *the Surface of ſome* Pebble Stones, *a Flake of* Snow, *a few Grains of* Sand, *or almoſt any natural Production, by Means of the* Microſcope, *exhibit exquiſite Beauties: While, on the contrary, the moſt delicate Works of Art can by no means bear its Examination; but degenerates before its View, into Maſſes of Irregularity, and* Deformity.

Thus far have we ſeen a few of the innumerable Inſtances *of the moſt conſummate Wiſdom of the* SUPREME BEING, *in the Contrivance of his* Works of Creation. *That even the* minuteſt *Part of his Works is wiſely contrived to anſwer its proper Uſe and End; while it anſwers various other, and ſeemingly contrary, Ends, at the ſame Time; ſo as to become a* neceſſary *Member of the immenſe Whole.*

HENCE we have ſeen, from the ſlight View we have taken of the *Divine Works,* from the moſt amazingly *huge,* to the moſt *minute* Bodies, that the *great Author* of them is wiſe above all finite Comprehenſion! And if Men are not aſtoniſhed and ſtarted at the *amazing* Effects of the *Divine Power,* in the curiouſly contrived Motions of thoſe unweildy and ſtupendous Bodies, the *Planets* and *Comets,* revolving with ſuch prodigious Velocities, and in ſuch admirable Order, it muſt be becauſe they have not attentively conſidered them; or becauſe they have not been made acquainted with their *adequate Ideas.*

THE laſt INSTANCE we ſhall give of the *Power* of the ADORABLE CREATOR, from his ſtupendous Works, is in the aſtoniſhing and violent Effects of *Earthquakes,* as terrible and as deſtructive to human Safety and Happineſs, as the violent *Effects of War,* in the human Government of Affairs. Therefore we here preſent ſuch of our Readers as are not acquainted with this Part of *natural* Philoſophy, with the *ſuppos'd Cauſes* of Earthquakes.

The Earth abounding, univerſally, with *Caverns* and ſubterraneous Paſſages, and its Entrails being filled with great Quantities of *inflammable Matter,* it is no Wonder, that on the ſame *accidentally* taking Fire, and ſuddenly rarifying the Air and Vapours, that are pent up, in thoſe unſeen Regions, ſhould produce the ſame Effect as Gunpowder in blowing up a Mine. There are ſeveral Sorts of *Subſtances,* which being kept aſunder are cool and peaceable; but being put together, break out, ſome *inſtantly,* ſome more *ſlowly,* into Heat, Smoke, Fire and Flame! And an *artificial Earthquake* may be produc'd by burying under Ground a Quantity of *Paſte,* made of *Sulphur* and Filings of *Steel,* which in a few Hours will *ſwell and heave up the Ground,* and at laſt break out into Smoke and Flame.

Volcanos, or burning Mountains, are generally found in thoſe Parts of the World which are ſubject to *Earthquakes*; being the Vents or *Spiracles* of the inflamable Matter, which cauſes them; of which ſuch Quantities have been thrown out of Mount *Etna,* and other *Volcanos,* as are aſtoniſhing to think of.

Of the moſt terrible Earthquakes that have happened, that in *Sicily* in the Year 1692-3, deſtroy'd and greatly damag'd *fifty four* Cities and Towns, beſides a great Number of Villages; particularly the City of *Catanea*, in which, of 18 *Thouſand* 914 Inhabitants, 18 *Thouſand* were ſwept to one Grave in a Moment, and never more ſeen. In that whole *Iſland* about 60 Thouſand periſh'd of 244 Thouſand 900 People. In *Jamaica*, where Earthquakes are very frequent and dreadful, one happen'd in the Year 1692, which in two Minutes ſwallowed up nine Tenths of the Town of *Port-Royal*. The Earth opening, ſwallow'd People up in *Crowds*, ſome of whom were thrown up in other Places; ſome were preſs'd to Death by the cloſing Earth, with their Heads left above Ground, which the Dogs prey'd upon before they could be got out and buried. Whole Plantations were a great Way removed from their firſt Seats; and *Ships* in the Harbour were overſet and loſt, and ſome thrown far upon the dry Land. The Earth rolled like Waves of the Sea; and, at its Openings, *Rivers* of Water ſpouted up. The whole Scene was attended with *horrible Noiſes!* as of falling Mountains at a Diſtance; and with an inſufferable *Stench*; while the Vapours, which broke out, darken'd the Air. *Mountains* were puſh'd out of their Places, and ſtopp'd the Courſe of Rivers. Almoſt all the Houſes in the *Iſland* were thrown down, and a Thouſand Acres of Land ſunk outright. Of which *Ruins* the Author of this *Palladium* has been an Eye Witneſs.

At *Lima*, in *Peru*, 5 Thouſand People periſh'd by an Earthquake in 1687; beſides many loſt by a terrible one a few Years ago. There have been alſo terrible Earthquakes in *New England*, *Liſbon*, and other *Places*, (beſides the Shocks felt in this Nation, on *March* 8, 1750 and before) too tedious to mention. *See an ingenious Production, entitled an Idea of the Creator from his Works.*

If Plagues and Earthquakes break not Heaven's Deſign,
Why then a Borgia *or a* Cataline?

Pope's Eſſay on Man.

☞ *For want of Room we are obliged to poſtpone our Military Materials, and the Subjects of War and Government, 'till future Palladiums.*

The ROYAL CHRONOLOGER *for the* YEAR 1760: *Being a* MEMORANDUM *of the* Holidays, Birth-days, remarkable Days, &c,

CHRONOLOGICAL NOTES for 1760.

Dominical Letter, N. S.	FE	*Sexageſima*	10
Old Stile	BA	*Quinqua.* or *Shrove-Sunday*	17
Golden Number	13	*Aſh-Wedneſday*	20
Cycle of the Sun	6	*Quadrageſima, or 1ſt Sunday in Lent*	Feb. 24
Indiction	8		
Epact	12	*Palm Sunday*	Mar. 30
Septuageſima Sunday	Feb. 3	EASTER	Apr. 6

Low

Low Sunday	Apr. 13	EMBER DAYS.
Rogation	May 11	Feb. 27, 29, Mar. 1
Aſcenſion-Day	15	May 28, 30, 31.
Whitſunday	25	Sep. 17, 19, 20.
Trinity-Sunday	June 1	Dec. 17, 19, 20.
Advent	*Nov.* 30	

HOLIDAYS kept at

The EXCHEQUER, STAMP-OFFICE, EXCISE-OFFICE, ‖ CUSTOM-HOUSE, and SOUTH-SEA-HOUSE.

For 1760.

Ms.	D.	Holidays.
Jan.	1	Circumciſion
	25	St. Paul.
	30	K. Charles I. Mart.
Feb.	2	Purif. V. Mary.
	19	Shrove Tueſday.
	20	Aſh Wedneſday
Mar.	1	St. David.
	25	Lady-day.
Apr.	4	Good Friday.
	7	Eaſter Monday.
	8	Eaſter Tueſday.
	9	Eaſter Wedneſday.
	23	St. George.
	25	St. Mark.
	26	Duke Cumb. born.
May	1	St. Philip and James.
	15	Aſcenſion Day.
	27	Whit-Tueſday.
	28	Whit-Wedneſday.
	29	K. Char. II. Reſtor.
June	4	Geo. P. of *Wal.* born.
	11	St. Barnabas.
	22	K. Geo. II. Inaug.
	24	St. John Bap.
	26	K. Geo. II. proc.
	29	St. Pet. and Paul.
July	15	St. Swithin.
	25	St. James.
Aug.	1	Lammas Day.
	24	St. Barthol.
Sept.	2	Lond. burnt.
	14	Holy Rood.
	21	St. Matthew.
Octo.	18	St. Luke.
	22	K. Geo. II. crown'd
	28	St. Sim. and Jude.
Nov.	1	All Saints.
	2	Prs. Or. born.
	5	Powder Plot.
	9	Ld. Mayor's Day.
	10	K. Geo. II. Birth-day kept.
	28	Q. Eliz. Acceſſ.
	30	Prs. Dow. Wal. born.
Dec.	21	St. Thomas.
	25	Chriſtmas Day.
	26	St. Stephen.
	27	St. John.
	28	Innocents.

N. B. At the *Cuſtom-houſe* there is *no Holiday* on *St. David, Eaſter Wedneſday, Duke of Cumberland's Birth-day, Whitſun-Wedneſday, St. Swithin, Lammas-day, Fire of London,* or *Holy Rood.*

At the *South-Sea-Houſe* there is *no Holiday* on *Valentine, St. David, St. Swithin,* or *Holy Rood.*

ALL the HOLIDAYS and REMARKABLE DAYS for the YEAR 1760.

†⸸† The *Feſtival* marked with * is preceded by a *Vigil* or *Faſt.*

If any of the Feaſt-days marked * fall upon a *Monday,* the Vigi or Faſt muſt be kept on the *Saturday* before, and not on the *Sunday,* which is the greateſt of *Feſtivals.*

JANUARY

JANUARY xxxi Days.

1 *Circumciſion.*
4 Sir *Iſaac Newton* born 1643, N. S.
5 Old Chriſtmas Day.
6 *Sun. of Ep.* or *Twelfth Day.*
8 Lucian.
10 *Princeſs Elizabeth* b. 1740
13 1 *Sunday after Epiphany.* Hillary.
14 Oxf. & Camb. Ter. beg.
15 Exchequer opens.
17 Old Twelfth-day.
18 Priſca.
20 2 *Sunday aft. Epiphany.* Fabian. Oct. Hil. 1 ret.
21 Agnes.
22 Vincent.
23 Hillary Term begins.
25 *Converſion of St. Paul.*
27 3 *Sunday after Epiphany* Quind. Hil. 2 ret.
30 K. Cha. II. Mar. 1648-9 O. S. 12 min. paſt One.

FEBRUARY xxix Days.

2 *Purification of B. V. M.* or Candlemas-day.
3 *Septuageſima.* Blaize. 3 ret.
5 Agatha.
9 Oct. Purif. 4 ret.
10 *Sexageſima.* Dies Scholaſtica at Oxford.
12 Hillary Term ends.
13 Old Candlemas Day.
14 Valentine.
17 *Quinqua.* or *Shrove Sund.*
20 Aſh Wedneſday.
21 Camb. Com. for Batch. of Arts.
24 *Quadrageſima,* or 1 *Sunday in Lent.*
27 St. *Matthias.** Ember.
28 Hare-hunting goes out.
29 *Ember.*

MARCH xxxi Days.

1 David, *Ember.*
2 2 *Sunday in Lent.* Cedde or Chad.
5 Prs. *Mary* of *Heſſe* b. 1723.
7 Perpet. Maurit.
9 3 *Sunday in Lent.*
12 Gregory.
16 4 *Sunday in Lent.*
17 St. Patrick.
18 Edw. K. of W. Sax.
19 Princeſs *Louiſa* born 1749. Joſeph.
20 Cuthbert. Eq. Day & N. Camb. lat. Act.
21 Benedict.
23 5 *Sunday in Lent.* or *Paſſ. Sunday.*
25 Annun. *Lady-day* 1 Q. Day. Pr. Edw. b. 1739.
29 Ox. & Cam. Terms end.
30 *Palm Sunday.*

APRIL xxx Days.

1 All Fools Day.
3 Richard.
4 Ambroſe *Good Friday.*
5 Old Lady-Day.
6 EASTER SUNDAY.
7 *Eaſter Monday.*
8 *Eaſter Tueſday.*
13 1 *Sund. aft. Eaſter,* or *Low Sunday.*
15 Sun and Clocks together.
16 Ox. and Camb. Term beg.
20 2 *Sund. aft. Eaſt.* 1 ret.
23 Eaſt. Term beg. St. Geo.
25. St. *Mark.*
26 D. of Cumberland b. 1721.
27 3 *Sunday aft. Eaſter.* ret. Vict. of Culloden.

MAY xxxi Days.

1 St. *Philip and James.*
3 Invention of the Croſs.
4 4 *Sund. aft. Eaſter.* 3 ret.
5 Weſtminſter Elect.
6 St. John Ant Port. Lat.
11 5 *Sund. aft. Eaſter,* or *Regat. Sund.* 4 ret.
12 Old May Day.
12, 13, 14 Rogation Days.
15 Aſcenſion, or Holy Thurſd.
16 ——— Return.

28 6 *Sund. aft. Eaſter.*
19 Dunſtan. Eaſt. Term ends.
22 Ox. and Camb. Terms end.
24 Pr. Fred. Will. b. 1750
25 *Whitſunday.*
26 Auguſtine.
No Night, all Twil.
27 Venerable Bede.
28 Ember.
29 K. *Charles* II's *Nativity and Reſtoration.*
30 Ember.

JUNE xxx Days.

1 *Trinity Sunday.* Nicomedes.
2 *Trinity Monday.*
Trin. Col. Elect. 1 ret.
3 *Trinity Tueſday.*
4 George Prince of Wales born 1738.
Ox. and Camb. Term beg.
5 Boniface. *Corpus Chriſti.*
8 1 *Sund. aft. Trin.* 2 ret.
10 Princeſs Amelia b. 1711.
Princeſs Carolina b. 1713.
11 St. *Barnabas.*
15 2 *Sund. aft. Trin.* 3 ret.
16 Sun and Clocks together.
17 St. Alban.
20 Tranſ. Ed. K. Weſt Sax.
22 3 *Sund. aft. Trin.* K. Geo. II. Inaug. Longeſt Day.
24 St. *John Baptiſt* *
SECOND QUARTER DAY.
25 St John's Coll. Election.
26 K. Geo. II. proclaim'd.
29 4 *Sund. aft. Trin.* St. *Peter.* *
30 Buck Hunting comes in, and continues till Holy Rood. Ex. Col. Elect.

JULY xxxi Days.

1 Camb. Commencement.
2 Viſitation of V. Mary.
3 Dies Comitior.
4 Tranſ. of St. Martin.
5 Old Midſummer Day.
6 5 *Sund. aft. Trin.*
7 Thomas à Becket.
8 *Oxford Act.* 7 days from Camb. Commen. incl.
13 6 *Sund. aft. Trin.*
15 St. Swithin.
20 7 *Sund. aft. Trin.*
Margaret.
22 Mary Magdalen.
Princeſs Carol. Matilda b. 1751
24 Magdalen Col. Elect.
25 St. *James* *
26 St. Anne
27 8 *Sund. aft. Trin.*
30 Dog Days begin.
Sirius riſes with the Sun.

AUGUST xxxi Days.

1 Lammas Day.
3 9 *Sund. aft. Trinity.*
6 Transfiguration.
7 Name of Jeſus.
10 10 *Sund. aft. Trin.*
St. Lawrence.
11 Princeſs Auguſta b. 1737.
15 Aſſumption of V. M.
17 11 *Sunday aft. Trin.*
21 Athanaſius.
24 12 *Sund. aft. Trin.*
St. *Bartholomew* *
28 St. Auſtin.
29 Beheading of St. John the Baptiſt.
30 Sun and Clocks together.
31 13 *Sund. aft. Trin.*

SEPTEMBER xxx Days.

1 Giles.
2 London Burnt. 1666. O.S.
7 14 *Sund. aft. Trin.*
Eunurchus.
8 Nativity B. V. M.
9 Dog Days end.
14 15 *Sund. aft. Trin.*
Holy Croſs Day.
17 Lambert. Ember.
19 and 20 Ember.
21 16 *Sund. aft. Trin.*
St *Matthew.*
22 Equal Day and Night in all the World.
26 Cyprian.

28 17 *Sund. aft. Trin.*
Sheriff of London Sworn.
29 St. *Michael.*
THIRD QUARTER DAY.
Hare Hunting comes in, and laſts till the End of February.
30 St. Jerom.

OCTOBER xxxi Days.

1 Remigius B. Rhemes.
5 18 *Sund. aft. Trin.*
6 St. Faith.
9 St. Dennis.
10 Old Michaelmas Day.
Ox. and Camb. Term beg.
12 19 *Sund. aft. Trin.*
13 Tranſ. K. Edw. Confeſſ.
17 Etheldred Virg.
18 St. *Luke.*
19 20 *Sund. aft. Trin.*
22 K. Geo. II. crown'd 1727.
25 Criſpin.
26 21 *Sund. aft. Trin.*
28 St. *Simon and Jude* *

NOVEMBER xxx Days.

1 *All Saints.* *
2 22 *Sund. aft Trin.* All Souls.
3 All Souls Coll. Elect. 1 ret.
4 King William born.
5 Powder Plot 1605. O. S.
6 Leonard. Mich. Term. beg.
7 Pr. Hen. Fred. b. 1745.
9 23 *Sund. aft. Trin.*
K. Geo. II. b. 1683. N. S.
Lord Mayor's Day, *Lond.*
10 K. Geo. II. Birth Day kept.
11 St. *Martin.*
12 2 return.
13 Britius.
15 Machutus.
16 24 *Sund. aft. Trin.*
17 Hugh. Anniverſary of Q. Eliz. Procl. 1558.
18 3 return.
20 Edmund.
22 Cecilia Old Martinmas Day.
23 25 *Sund. aft. Trin.*
St. Clement.
25 Catherine 4 ret.
27 Baliol. Col. Elect.
28 Michaelmas Term ends.
30 ADVENT SUNDAY.
St. *Andrew* * Princeſs Dow. of Wales b. 1719.
Anniverſary Meeting of the Royal Society.

DECEMBER xxxi Days.

4 Barbary.
6 Nicholas.
7 2 *Sund. in Advent.*
8 Conception of B. V. M.
13 Lucy.
14 3 *Sund. in Advent.*
16 O Sapientia.
17 Ox. and Cam. Terms end.
Ember.
18 Princeſs Louiſa, Q. of Denmark b. 1724.
19 and 20 *Ember.*
21 4 *Sund. in Advent.*
St. *Thomas.* Shorteſt Day.
23 Sun and Clocks together.
25 *Chriſtmas Day.* *
4 QUARTER DAY.
Fox Hunting comes in, and laſts till Lady Day.
26 St. *Stephen.*
27 St. John Evangeliſt.
28 1 *Sund. aft. Chriſt.*
Holy Innocents.
31 Sylveſter B. of Rome.

PART of the ROYAL EPHEMERIS, for *Greenwich* OBSERVATORY; 1760.

See towards the END of this WORK for the REST.

NEW, FULL, and QUARTER MOONS.

D.	January.	D.	February.	D.	March.
	h m		h m		h m
2	4 51 A. Full	1	6 24 M. Full	1	9 17 A. Full
10	5 56 M. Laſt Q.	9	3 20 M. Laſt Q.	9	11 55 A. Laſt Q.
18	6 32 M. New	16	6 42 A. New	17	8 3 M. New
25	7 11 M. Firſt Q.	23	3 17 A. Firſt Q.	23	11 48 A. Firſt Q.
				31	1 7 A. Full
D.	April.	D.	May.	D.	June.
	h m		h m		h m
8	5 35 A. Laſt Q.	8	7 21 M. Laſt Q.	6	5 17 A. Laſt Q.
15	5 11 A. New	15	1 5 M. New	13	8 18 M. New
22	7 10 M. Firſt Q	21	7 56 A. Firſt Q.	19	8 33 M. Firſt Q.
30	5 27 M. Full	29	9 26 A. Full	28	0 19 A. Full
D.	July.	D.	Auguſt.	D.	September.
	h m		h m		h m
6	0 16 M. Laſt Q.	4	5 50 M. Laſt Q.	2	11 18 M. Laſt Q.
12	3 53 A. New	11	0 49 M. New	9	11 50 M. New
19	11 37 A. Firſt Q.	18	4 37 A. Firſt Q.	17	11 24 M. Firſt Q.
28	1 27 M. Full	26	1 32 A. Full	25	0 21 M. Full
D.	October.	D.	November.	D.	December.
	h m		h m		h m
1	5 56 A. Laſt Q.	7	7 2 A. New	7	2 8 A. New
9	2 0 M. New	15	11 19 A. Firſt Q.	15	2 13 A. Firſt Q.
17	6 12 M. Firſt Q.	22	9 24 A. Full	22	7 27 M. Full.
24	10 46 M. Full	29	1 59 A. Laſt Q.	29	5 0 M. Laſt Q.
31	2 34 M. Laſt Q.				

Note, A denotes Afternoon, and M, Morning.

NEW ÆNIGMAS.

I. ÆNIGMA 100. By Mr. ISAAC TARRAT of *Epſom*.

1.

YE talk of *Riddles*, here I come,
A moſt accompliſh'd *Rake*;
When young and growing I was dumb,
But now aloud can ſpeak.

2.

A *Linguiſt* near the '*Change* is known
That's Maſter of *Eleven*;
In me the Pow'r of Art is ſhewn,
For I can ſpeak you *Seven*.

3.

Engliſh and *Iriſh*, and broad *Scotch*,
No Stranger at *Turin*;

Italian, *Flemiſh* and *High-Dutch*,
A Favourite at *Berlin*.

4.

When young I wore a Cap of *Green*,
Behold how *Modes* do change;
In *Black* or *Brown* now moſtly ſeen,
What Clime ſoe'er I range.

5.

Old *Argus* had a hundred Eyes,
That ſubtle watchful *Couſin*;
One Truth, pray hear, without Diſguiſe,
I've half a *Baker*'s Dozen.

II. ÆNIGMA, 101. By the ſame GENTLEMAN.

THINK not, fair *Ladies*, I'm a Cheat,
Though I moſt Hands can counterfeit;
Indeed my *Pedigree*'s but low,
For 'tis to Brutes my Birth I owe.
But what Improvements can be made
By *Education*'s friendly Aid?
Art took me from my Mother's Side,
And did a kinder Nurſe provide;
Whoſe Care ſo far prevail'd, that ſoon
I found my native Roughneſs gone.
But ſuch my *Pride (ſhame to reveal!)*
My Parents I would fain conceal;
Thoſe Beings whence I did attain
My ſecond Being; but in vain:
We're ſo alike, that who they are
My very Features muſt declare.
By them I was train'd up to arms,
And made the Guard of female Charms;
And tho' I ſeem of gentle Mein,
At Combats I have often been.
But ſhould you think I favour *War*,
To ſhew how much I Peace prefer,
I've ſuch obliging Ways about me,
There's ſcarce a Viſit made without me:
And I am dreſs'd, where e'er I go,
To ſympathize with Joy, or Woe.

III. ÆNIGMA, 102. By Mr. *Thomas Sadler* of *Norbury*, Cheſhire.

WHEN I ſet out but few can tell,
Who near the *Iſle of Ely* dwell;
Sometimes I'm high, and ſometimes low,
And oftimes am a public ſhow;
Fickle I am and unconfin'd,
And am as wav'ring as the Wind.
In various Shapes I oft appear,
And ſtill a *Chriſtian* Name I bear.
Ye *Fair*, who glitter at a Ball,
For Brightneſs I excell you all?

Like *Damon* too, I have been ſeen,
To dance at Night upon the *Green*.
Oftimes I trip the Flow'ry Mead,
And *dextrouſly* the Water tread;
Or, on ſome lonely *Deſart* range,
And fluctuating oftimes change.
Alternative upon the Plain,
Some Men purſue my Steps in vain;
And ſome with *Terror* fly from me,
Or at my Sight, affrighted be;
Others on me with Wonder gaze,
And thence will ſtrange Conjectures raiſe.
The *Pranks* I've play'd moſt Men ſurprize;
But whence I come they can't deviſe;
Some think that I'm deriv'd from Nought,
So *hypothetical*'s their Thought.
In Solitude my Life I ſpend;
Adieu, ye Fair, 'tis Time to end.

IV. ÆNIGMA, 103. By the ſame *Gentleman*.

FOR my *Original* ſearch Parent *Earth*,
Whence you will find ſhe gave our *Lineage* Birth;
Who bred *us* up to make a gallant Shew,
And then endure ſome various Scenes of Woe.
Were *rub'd* and *cruſh*'d to gain our *preſent* State,
By Man endure ſuch dire Extremes of Fate;
From Town to Town we oft to Market go,
And ſold to thoſe who well our Worth do know:
Mangled and bruis'd and drown'd, and eat at laſt,
Five Hundred Brethren ſerve for one Repaſt,
Thoſe who in *Dainties* exerciſe Delight,
We moſt attend, — their Appetite excite;
Where *Grandeur* dwells we ſtill at Table wait,
And ſometimes at a humble *Cottage* Treat.
A *Sov'reign* Remedy in us you'll find;
And yet we are the *Dread* of human Kind:
The *Ladies* love us but we'll not expoſe —
And he that does, we'll take him by the Noſe.

⁂ *Whoever ſends the beſt Anſwers to the following Ænigma before* Candlemas *next, will be entitled, by Lot, to* 4, 3, *and* 2 Palladiums, *to be delivered in* London *according to Direction.*

PRIZE ÆNIGMA. *By Mr.* CHRISTOPHER MASON, of Eaſtburn, Suſſex.

TO fifty of my Fellows I am ſent,
All Sharers of one cloſe Impriſonment;
In wooden *Tower* prepar'd for our Reſtraint.
Silent we paſs our Time each livelong Day,
Unus'd to Plots, unknowing to betray.
When ſome bold Hand unbolts our Iron Bar,
Then we once more at Liberty appear;
Tho' free'd, we find that our Releaſe is ſhort,

And whilſt at large we're made to ſerve for Sport.
When on an *Errand* ſent, how ſwift we fly!
And then to take us, how our Jailors try:
We hide our Heads in Earth; but all in vain,
By hot Purſuit we're *Captives* made again.
Various our *Fortunes*, having done much Harm;
Three *Wings* we have, but neither *Leg* nor *Arm*;
Yet from no monſtrous Birth our Kind proceeds,
Which for exact Proportion none exceeds,
And *Champions*-like, wear Helmets on our Heads.

The QUERIST.

NEW QUERIES.

I. QUERE 102. *By Mr.* HUNTLEY, *of* Burford.

FOR what End does EUCLID pretend to *demonſtrate* ſeveral PROPOSITIONS, that are ſelf-evident, and may be taken as *fundamental Axioms*, to demonſtrate Truths, in Geometry, that are not ſelf-evident? Eſpecially as Mr. *Locke* ſhews, in his *Human Underſtanding*, that Knowledge *ſelf-evident*, neither admits of, nor requires, any *Proof*?

II. QUERE 103. *By Mr.* THOMAS HALL.

WHETHER *Credit* in Trade, tends moſt to its Prejudice, or Advantage?

III. QUERE 104. *By the ſame* Gentleman.

IN the Year 1759, on *Saturday*, 13th *January*, about 8 in the Morning, an Eclipſe of the *Moon* happened at *Greenwich*, on what Year, and on what Month-Day, Week-day, and Hour of the Day will this Eclipſe return, or happen again?

IV. QUERE 105. *By Mr.* Alexander Rowe.

WHY *Twinkling*-Lights the Stars appear?
Why Planets ſteady Faces wear?

V QUERE 106. *By Mr.* Iſaac Tarrat *of* Epſom.

Mr. Pope ſays, in his *Eſſay on Man*,

"Reaſon's whole Pleaſure, all the Joys of Senſe
"Lie in three Words, *Health*, *Peace*, and *Competence*."

What is *Competence*?

VI. QUERE 107. *By the ſame* Gentleman.

WE frequently hear of *Trees*, *marine Shells*, and *Bones* of Animals being dug out of the Earth, and at a great Diſtance from the Sea, ſuppoſed to have been left there at *Noah*'s Flood; and many of the *oriental* Writers, as well as our own Countrymen, *Burnet*, *Whiſton*, *&c.* are of Opinion that the Inhabitants of the *antediluvian* World were more populous than the preſent. *Quere* the Reaſon why there are not great Quantities of human Bones found, in like Manner as above? And whether it was a *partial* or *general* Deluge?

VII. QUERE 108. *By* Amelia.

WHY the Moon appears much bigger at Riſing, then when ſhe is aſcended far above the Horizon?

VIII.

VIII. QUERE 109. *By Mr.* Freeman.

HOW far is a Cannon from you, when you hear the Sound 10 Seconds of Time after ſeeing the *Flaſh* ?

IX. QUERE 110. *By Mr.* Williams.

HOW deep is that *Well*, when you hear the Sound of a Stone ſtriking the Water at the Bottom, 4½ Seconds of Time after you let it fall ?

X. QUERE 111. *By* Brittanicus.

WHAT are the Limits of North and South *America* ?

XI. QUERE 112. *By Miſs* Sprightly.

What is Wit ?

XII. QUERE 113. *By Miſs* Ray.

What is Truth ?

XIII. QUERE 114. *By* Ens Rationale.

WHETHER the *Chatham* Philoſopher, (who denies the Exiſtence of the *Rays* and Subſtance of *Light*) be a *Shadow* without Subſtance, a Being without Senſes, or a Man, or a Maggot ? And whether *imaginary*, *chimerical*, or *real Ideas*, are not the Proof of *imaginary*, *chimerical*, or *real* Knowledge ?

⁂ *Whoever ſends the beſt Anſwers to the following Quere by* Candlemas-day *has a Chance, by Lot, for* 4 *and* 2 Palladiums, *which will be delivered in* London *according to Directions given.*

PRIZE-QUERE *by Mr.* CHRISTOPHER MASON.

IN what Year of the *Julian* Period, and in what Year before *Chriſt* and on what Day of the Month and Week-day, *Julian* Style, was the World or Univerſe (moſt *probably*) created, about which there is ſo wide a Difference among *Chronologiſts* ?

NEW QUESTIONS.

I. QUESTION 162. *By a* CADET.

A GARRISON of 6500 Men has *Proviſion* for 64 Days ; but is ſo blocked up by the Enemy going to beſiege it, that it has but *one Way* of being relieved and ſupplied, at the End of 12 Weeks: The *Governor* being able to hold out for that Time : *How many* Men muſt he diſcharge, that the Proviſions in Store may be ſufficient for the reſt ?

II. QUESTION 163. *By a* Military Officer.

THERE are 8000 Men in a *Garriſon* beſieged, whoſe *daily* Allowance is 24 Ounces of Bread for 7 Weeks ; but the *Governor* finding the Siege is likely to continue a longer Time, who can hold out 34 Weeks, at *leaſt*, tho' he has by this Time loſt 1500 of his Men ; whereby he finds himſelf obliged to ſhorten that Allowance of Proviſions: *How much* Bread muſt each Man's daily *Allowance* be reduced to?

III. QUESTION 164. *By a young* Gentleman *of* Woolwich-*Academy*.

IF 250 Men in 6 Days of 12 Hours long, can dig a Trench 236 Yards long, 4 Yards wide, and three deep ; in *how many* Days of 10 Hours long, can 50 Men dig a Trench 350 Yards long, 16 Yards wide, and 4 deep ?

IV.

IV. QUESTION 165. *By an* ENGINEER.

IN what Direction muſt a *Cannon* (a twenty four Pounder) be placed, o hit an Object whoſe Diſtance is 7333 Feet, on a *Plane* depreſs'd 11° elow the horizontal Level, the greateſt horizontal Random of the Piece being 8190 Feet?

V. QUESTION 166. *By Mr.* George Stapley.

THE Breadth of a *River* is 1000 Feet; and the *Peers* of a Bridge uilt over it take up 720 *Feet* of that Breadth; the *Velocity* of its Stream is 3 *Feet* in a *Second* of Time: *Required* how many Feet the reateſt *Fall* of the Water will be by that Impediment?

VI. QUESTION 167. *By Mr.* W. Williams *of* Hackney.

REQUIRED the true Time of the *vernal* and *autumnal* Equinoxes, Summer and Winter *Solſtices*, alſo the Spaces of Time from the *ver-al* to the *autumnal*, and from the *autumnal* to the *vernal Equinoxes*, or the 706 and 2365 Years of the Julian Period; and to give the Me-hod of Computation?

VII. QUESTION 168. *By a* Gentleman *of* Chatham Dock-Yard.

REQUIRED the ſolid *Feet* of Timber in a dry Oak Tree, weighing Hundred and $\frac{1}{3}$ of a Hundred Weight, by a *general Rule?* And to ive a *general Method* of meaſuring all Sorts of Timber, or other Wood (uſed in building *Ships* and *Houſes*) by Weight, allowing for dif-rent *Dryneſs* and *Texture* of the ſame Kind of Wood?

VIII. QUESTION 169. *By Mr.* George Stapty.

A PIECE of round Timber is 24 *Feet* long, and $\frac{1}{4}$ of the Circum-rence at the Bottom (commonly called the *Girt*) is equal to $3\frac{1}{2}$ eet; and at the upper End the *Girt* is $\frac{1}{2}$ Foot, and conſequently is eet in the Middle: Now, according to the common Way of mea-ring round Timber, the *Solidity* is 96 Feet: *Required* to find *how* uch, in Length, may be cut off from the Top, and yet the *ſolid* ntent of the remaining Part, meaſured in the *common Way*, by ta-ing the fourth of the *Girt* in the *Middle*, ſhall be exactly 96 *Feet?* nd to determine the *true Quantity* of each Piece of Timber?

X. QUESTION 170. *By Mr.* George Brown *mathematical and Wri-ting-Maſter*, at *Portſmouth-Common*.

REQUIRED the Year, Day of the Month, and Week-day *Julian* yle, anſwering to the 1126 Year of the *Turkiſh Hegira*, and 12th y of the ſecond *Turkiſh* Month *Saphar?*

X. QUESTION 171. *By Mr.* George Stapley.

BEING at an Entertainment with a *Gentleman* and *Lady* lately mar-d, where our Ages became the Subject of Converſation, the Lady s pleaſed to communicate her own and Huſband's Age as follows. "*If both our Ages are added together their* Sum *will be* 88 *Years*; *d if the Date of the Year in which I was born be divided by my* Huſ-*d's Age, the Quotient will be equal to my Age, when* 6 *Years and* $\frac{6}{7}$ *e added; but, if you divide the* Date *of the Year in which my ſband was born by my Age, the Quotient will be equal to his Age, when Years and* $\frac{7}{9}$ *are added*:" *Required their Ages?*

XI. QUESTION 172. By Mr. *Thomas Sadler*, Mathematical Maſter, at *Norbury*, *Cheſhire*.

A worthleſs *Miſer*, as I'm told,
Had hoarded up vaſt Store of Gold:

Large *Sums* put out to Uſury,
'Till aged fourſcore Years and three;
When Death depriv'd him of his Pelf,
And took him from his *ſecond Self*.
Of Wives, it happen'd he had three,
Three Sons, and Daughters *two* had he;
His third Wife did ſurvive him ſtill;
But mark the Tenor of his Will.
Of ruſty Gold *ten thouſand* Pound
Was in this Miſer's Coffers found;
Each Son muſt be paid down in Store
Each Daughter's *Fortune* three Times o'er,
Each Daughter's, as the *Will* was made,
Muſt twice the *Widow*'s Part be paid;
Now th' *Old* Miſer's in his Grave,
Tell me the Fortune each muſt have?

XII. QUESTION 173. *By Mr.* George Stapley.

REQUIRED to find the *leaſt* 3 *whole* Numbers ſo that $\frac{3}{8}$ of O $\frac{5}{14}$ of another, and $\frac{7}{20}$ of a third ſhall be all equal?

XIII. QUESTION 174. *By Mr.* John Buddle, *at* Cheſter Le Stre *near* Durham.

A MASTER of a Ship being at Sea, on *May* 19th 1759, in L titude 40° 20′ N. took the Sun's equal Altitudes, obſerving Times of thoſe Obſervations, by his Watch, at 9^h 12^m, in the Fo noon, and 2^h 59^m in the Afternoon: *Required*, from thence, Time by his *Watch*, on that Day, when the Sun paſſed the Meridi or was at his *greateſt* Altitude?

XIV. A NEW QUESTION in Navigation, 175. *By the Author of* Royal Aſtronomer *and* Navigator.

Given a Ship's conſtant Courſe S. 27° 10^m *weſterly, in ſailing twixt two Places, both in North Latitude; the Diſtance ſailed on Courſe* 1189.2 *Minutes of a Degree, and the Difference of Longitude thoſe Places* 12° 8′ W. *Required their Latitudes, reſpectively?*

17.28
41.47

XV. QUESTION 176. *By Mr.* Paul Sharp.

THERE is a *rectangular Ciſtern*, holding the *greateſt* Quantity ſible of its *Dimenſions*; whoſe Length is 8 Feet, and the Length the *longeſt* ſtrait Rod that can be put into it, 10 *Feet*: Required *Breadth* and *Depth* of this Ciſtern; and *how long* it will be emptyi when full of *Water*, through a *circular Hole* of 2 Inches Diameter the Bottom thereof?

4.243
4.243
144

XVI. QUESTION 177. *By* ANALYTICUS.

A Perſon owes me a Sum equal to the Value of a Number of Guin *and* Shillings. *The* Difference *of the* Cubes *of the Guineas and Shill is equal to* 45 *times the Product of the Guineas and Shillings and* 27 *and the Difference of the* Squares *of the Guineas and Shillings is equ* 12 *Times the Sum of both. What is the Debt due to me; the Guineas* leſs *than the Shillings?*

XVII. QUESTION 178. *By Mr.* Paul Sharp.

THE *Abſciſſa*, Semiordinate, and Parameter, of the leaſt *Parabola*, that will circumſcribe a *Circle*, are equal to $\frac{9}{8}$, $\frac{3}{4}$, and the ſaid Circles Diameter, and the *Parameter* multiplied by ,630547 is equal to the Difference of the Circles *Periphery*, and Curve of the ſaid *Parabola*: Required the *Demonſtration*?

XVIII. QUESTION 179. *By Mr.* Joſeph Wooſe, *of Mr.* Johnſon's *School at* Hull.

GIVEN the Altitude of a Cone 50 Inches, and the Difference between the greateſt inſcribed Hemiſphere and Cube = 5 Wine Gallons, to find the Dimenſions of each of thoſe Solids?

XIX. QUESTION 180. *By Mr.* Geo. Brown.

SUPPOSE a *conical* Glaſs of Diameter at Top 5, and Height from the Bottom 7 *Inches*, to be $\frac{2}{5}$ths full of Water; *Required* the Dimenſions of that Spheroid, whoſe Segment being immers'd in the Water, with its Conjugate Parallel to the Glaſs's Top Diameter, ſhall cauſe it to riſe the *higheſt poſſible*, and alſo to give the Content of the immerſed *Segment*?

XX. QUESTION 181. *By the* Author.

REQUIRED the Value of *x*, when $\overline{l.\,x.}|^{\,l.\,x}$ is a *Minimum*; *l* denoting the *hyperbolic* Logarithm of *x*?

⁂ *Whoever anſwers the following Queſtion before the* 1ſt *of March next, has a Chance by Lot for* 12 Palladiums, *which will be delivered in* London, *according to Direction given.*

PALMÆ PROBLEMA a DOMINO HUNTLEIO, Burfordiæ.

GLOBI *duo* A *et* B (*quorum prioris pondus eſt unicarum, alterius* 10) *à viris duobus* 150 pedes *diſtantibus per* aream *conglaciatam ſimul projiciantur, et factâ percuſſione mutuâ, ad plagas diverſas tendunt. Summa Spationarum à* globis *ante impactionem percuſſorum æquat* 335 pedes, *et minoris momentum ad momentum majoris eandem tenet* rationem *quam* 7 *ad* 3. *Planum autem globos in puncto concurſos tangens, ex æquo ſecat virorum diſtantiam, et vis compreſſiva eſt ad vim claſticam ut* 16 : 7. *ſepoſitâ glaciei fricatione, et aliâ quâvis cauſâ motum retardante: Inveſtigentur* directio *et* celeritas *utriuſque globi impingendo acquiſitæ.*

NEW PARADOXES, REBUSES, &c.

I. PARADOX. By Mr. *W. Swift*, of *Staw*, near *Lincoln*.

WHEN *Speedwell* and *Hazard* had ballanc'd their Books,
Thus *Speedwell* to *Hazard* declares;
Tho' my GAINS are, I find, more than yours by ten Pounds,
Yet to *Each* the *ſame Cube-Root* appears.

II. PARADOX. By Mr. *George Stapley*.

Plant me twenty one Trees, juſt in *twenty four* Rows;
Four of Four, *Six* of Five, *Fourteen* of three compoſe.

I. *Rebus.* By Mr. *Stow*.

A *Metal* well known, and *Reverſe* of Denyal,
Give the Name of a Town—if you pleaſe to make Trial.

II. *Rebus.* By the Same.

A *Point* of the Compaſs, and a *Priſon* in London,
Which many have *ſet up*, and many have *undone*;
(I neither deceive, nor a *Story* invent)
Are the Name of a Town in the County of *Kent*.

A *Rebus Paradox.* By *Cunundrumenſis.*

The Name of a *Sex* join'd to what we *diſdain,*
Is the Name of an *Object* we ſeek to obtain!

ANSWERS to all the ÆNIGMAS in the PALLADIUM for 1759.

I. A SADDLE. II. A COLLAR. III. JACK and BOWLES. Pri A HALTER.

ONE of our *Fair* Correſpondents (Mrs. *Beaumont*) ſends us the following *excellent* QUOTATION on CONSTANCY, ſo amiable and ſo admir a *Quality* in her Sex.

But firſt let yawning Earth a Paſſage rend,
And let me thro' the dark Abyſs deſcend;
Firſt let avenging Jove, with Flames from high,
Drive down this Body to the nether Sky,
Condemn'd with Ghoſts in endleſs Nights to lie;
Before I break the plighted Faith I gave:
No; He who had my Vows, ſhall ever have;
For whom I lov'd on Earth, I'll worſhip in the Grave!

DRYDEN.

The *ſame* Correſpondent anſwers the *Prize Ænigma* on the *Inconſta* of the *Male* Sex.

THE Men who *deceive* us, are all clever *Fellows!*
Who have nothing to fear —— if they 'ſcape but t
G ——— s! Prize.

Anſwered by Mr. *Swift* of *Stow,* near *Lincoln.*

LIKE a HORSE ſtout and bold, to the Wars will I go,
I'll HARNESS myſelf, and I'll fight the proud Foe; 1.
As *ſwift* as the BOWLES to the JACK will I run, 3.
Neither Sword, Fire, or Water, nor *French* will I ſhun.
I hope that all *Traytors* and *Cowards* may SWING, Prize.
While each honeſt Tar drinks a Health to the *King.*
For *Scalping* — *Monſieur* a tight COLLAR ſhall wear, 2.
While *Britons* and *Pruſſians* illuſtrious appear!

H*ppocrates*'s Anſwer to the *Prize Ænigma,* in Advice to *Galen,* h Friend and Companion.

Beware, my Friend, the HALTER ſhun, *Prize.*
And from thy evil Courſes run;
And thou, at laſt, ſhall ſurely gain,
Immortal Joy for mortal Pain!

The *ſame* anſwer'd by Mr. *I. Hayden, Biſhopſton.*

YE *Knaves* and ye *Cheats* of the HALTER beware, Prize.
Leſt, by *Schemes* you contrive, you contrive your own Snare!

All anſwered by Mr. *George Stapley.*

A SADDLE, a COLLAR, JACK, BOWLES, and a HALTER,
Are eaſily ſolved by a Boy in his *Pſalter.*

We having not Room, cannot inſert the other Anſwers by M *Thomas Sadler,* of *Norbury, Cheſhire. Burfordienſis*; Mr. *Robert A* of *Watford, Northamptonſhire*; Mr. *Iſaac Tarrat* of *Epſom, on the S ject of the gallant Behaviour of our Admirals and Sea Officers*; Mr.

dle, of *Cheſter-lee-Street,* near *Durham, a Youth of* 15 *Years of Age, of uncommon Genius*; Mr. *I. Shield*; Mrs. *Mary Willater*; Mr. *Hicks* of the *Devizes*; *Amelia, Urania, Fidelia,* Miſs *Green,* and a great many others.

We acknowledge the Favours of all our ingenious Correſpondents, and hope they will excuſe us for omitting ſome of the leſs important Part of their Productions to inſert what we judge (and appeal to themſelves for our Opinion) is more *eſſentially neceſſary* for the Improvement of *uſeful Science.*

⁂ THOSE who are pleaſed to ſend us *new Ænigmas* (as full of Wit as they can hold) with elegant new or uſeful *Queries, Queſtions,* and *Paradoxes,* or witty Anſwers to the Ænigmas, we ſhall carefully diſtinguiſh according to their reſpective Merits.

And that none may be diſcouraged in trying their *Genius,* we aſſure our Male and Female Correſpondents, that they cannot poſſibly be *too witty* in their *Ænigmatic* or other Compoſitions, in Verſe or Proſe. For *Wit* (let them be appriz'd) is even an Excuſe for moſt of its own Faults; *Immorality* excepted. Therefore, all thoſe having a large *Stock* of *Wit* to diſpoſe of may ſend it forthwith with as much *Humour* with it as they can ſpare, and we (like faithful Agents) ſhall convey it to a proper Market.

The Productions of the *Queriſts, Problemiſts,* and others of *Science,* we ſhall duly diſtinguiſh in *proper Claſſes.* And we take Leave to apprize thoſe who are pleaſed to honour us with their Improvements, in theſe Reſpects, that as the *Palladium Plan* is *improved,* and pretends to contain more of the *ſelect* and *uſeful* than other annual Works, it will therefore not be amiſs for them to keep an Eye upon that RULE.

ANSWERS to the QUERIES in the PALLADIUM for 1759.

I. QUERE 89. Anſwered by Mr. *Huntley* of *Burford.*

THE Earth having her *half Surface* next the Sun always enlightened, while the *contrary* half Surface is involved in her *conic* Shadow, oppoſite to the Sun, projected to a conſiderable Diſtance beyond the Moon's Orbit; which ſhe paſſes through, moving along in her Orbit, ſhe is thereby deprived of the Sun's Light, and would be loſt to our Sight, 'till ſhe emerges, were we not involved in her Shadow at the ſame Time; where we behold her by ſome *Cauſe* of various Light caſt over her Face. Which Cauſe is probably the Earth's Atmoſphere (*wherein we are placed*) being ſubject to *perpetual* Changes, and endow'd with a Power of *reflecting* and *refracting* the Rays of Light differently; and, according to its different Diſpoſitions, produces different *Effects* of Viſion. And the Moon's *Face* is preſented to us in the various Colours of *red, Iron-Grey, bluiſh, yellowiſh,* and ſometimes *totally dark*; as have been obſerved by the moſt curious and eminent Aſtronomers.

II. QUERE 90, *anſwered by Mr.* Huntley.

WHEN the Moon's *Lat.* or her Diſtance from the Earth's Orbit, exceeds the *Sum* of the Semi-diameters of the Moon, and Earth's *Shadow,* at the Moon's Orbit, there can be no *lunar* Eclipſe; provided She is more than 12° 34′ from her *Node*; the Place where ſhe croſſes the Earth's Orbit.

When the Moon's Lat. exceeds the *Sum* of the Semidiameters of the Earth's *Diſk,* and the Moon's Shadow at the Earth, we ſhall ſuffer no

Deprivation of the Sun's Light, by the Moon's Interpoſition betwixt the Sun's Body and our Sight; provided the Moon's Diſt. from the *Node* exceeds 16° 26′.

Now, the Ecliptic *Boundaries* in the *latter* Caſe, exceeding thoſe in the *former*, more *Eclipſes* of the Sun will always happen than of the Moon.

Moreover, the Semidiameter of the Moon's *penumbral Cone*, being nearly 2450 Miles, and the Earth's Semidiameter almoſt 4000, 'tis evident, that the Earth's Hemiſphere in a *Solar Eclipſe*, cannot be totally involved therein. And, as we are not leſs than 3500 Miles from the *Equator*, a Number of *Solar* Eclipſes may happen, when the Moon's *Shadow* never reaches us. Which *Cauſe* not equally affecting *lunar* Eclipſes, is the Reaſon that *more Eclipſes of the Sun than of the Moon, happen.*

Remark, Eclipſes of the Sun are more frequent than thoſe of the Moon, (as has been ſhewn) becauſe the Ecliptic *Boundaries* for the former are greater than for the latter happening — Yet there are more *viſible* Eclipſes of the Moon than of the *Sun*; becauſe viſible lunar Eclipſes are equally ſeen of the ſame Bigneſs, from all Parts of the Earth's half Surface next the Moon: Whereas viſible *Solar* Eclipſes are unequally ſeen, of different Bigneſs, and only from a ſmall Part of the Earth's half Surface, next the Sun, whereon the Moon's Shadow falls — from one ſmall Part thereof are ſeen total — from the reſt of the ſmall Part of that Surface, *partial* — But from above two Thirds of the Earth's Surface a *Solar* Eclipſe is generally *inviſible*; whereas a lunar Eclipſe can be inviſible but to half the Globe — Hence another Reaſon for more inviſible Eclipſes of the Sun than Moon.

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Natural and *Artificial* Days (denoting among Aſtronomers the Times from Noon to Noon, and from Sun-riſe to Sun-ſet reſpectively) are Terms adopted by *Cuſtom* and long Uſage. Therefore it would be as difficult to alter thoſe Diſtinctions, as to introduce *new Terms* to denote *Light* and *Darkneſs*, or *Day* and *Night*, while the old Terms are ſo well underſtood, and eſtabliſhed by *general Cuſtom*.

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See Locke on the Abuſes and Imperfections of Words. Who has ſhewn that no Man's *Property* is ſafe, while the Meaning of *Laws*, or Writings for Security of Property, can be wreſted by *Lawyers*, explaining Words to ſignify *any Thing*, or *Nothing at all*.

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This *Full Moon* happens for *moſt Advantage* when the Angle of the Ecliptic, or Moon's Orbit, and the Horizon, at Moon Riſing, makes the leaſt Angle, being when *Aries* riſes and *Libra* ſets. And contrarily, when *Libra* riſes and *Aries* ſets, this Angle of the Ecliptic (or the Moon's Orbit nearly) and the Horizon is the *greateſt*; or nearly the *leaſt* when *Piſces* riſes and *Virgo* ſets, or nearly the *greateſt*, when *Virgo* riſes and *Piſces* ſets. So that the *autumnal* and *vernal* Full Moons, afford the *greateſt* and *leaſt* Light, alſo riſing the ſooneſt and lateſt after Sun-ſet, *reſpectively*. And the greater the Lat. of any Place leſs than 66° 29′, the Lat. of the Polar Circle, the *leſs* the Angle of Ecliptic and Horizon, when ♈ riſes: For, at the Polar Circle the Ecliptic and Horizon are coincident for a Moment, once every 24 Hours; and the next Moment one half of the Ecliptic, ♑, ♒, ♓, ♈, ♉, ♊, riſes, while the *contrary* Half ſets; affording a wonderful *Phænomenon*; the Moon being here moſtly above the Horizon in the Sun's Abſence. When the *Harveſt full Moon* at Riſing happens to be in the beginning of *Aries*, and near her *Nodes*, or has but ſmall Latitude; the Angle that the Moon's Orbit then makes with the Horizon at Riſing will be *leaſt*, or nearly ſo; and therefore her *Depreſſion* below the Horizon for 1 Days Motion, or more, will be the *leaſt* alſo; when ſhe will afford the greateſt Light for the *Farmer*'s Uſe; riſing the *ſooneſt* after Sun-ſet for a Week.

'Tis evident, this *full Moon* will always happen near the *autumnal Equinox* (as is providentially ordered) when the Sun ſets in *Libra*; the *Intervals* of her Riſing for two ſucceſſive Evenings will be *very ſmall*; ſcarcely exceeding 20 Minutes of Time.

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N	1751	1752	1753	1754	1755	1756	1757	1758	1759	1797
	1770	1771	1772	1773	1774	1775	1776	1777	1778	
	1788	1789	1790	1791	1792	1793	1794	1795	1796	
	1807	1808	1809	1810	1811	1812	1813	1814	1815	
	1826	1827	1828	1829	1830	1831	1832	1833	1834	
	1844	1845	1846	1847	1848	1849	1850	1851	1852	

Here the Moon, *in Dates to the Left is in the greater* N. *Lat. and deſcends to the greater* S. *Lat. in Dates to the Right.*

HARVEST MOONS affording the greater LIGHT

S	1760	1761	1762	1763	1764	1765	1766	1767	1768	1769
	1779	1780	1781	1782	1783	1784	1785	1786	1787	
	1798	1799	1800	1801	1802	1803	1804	1805	1806	
	1816	1817	1818	1819	1820	1821	1822	1823	1824	1825
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See *Ferguſon*'s Aſtronomy. p. 131.

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Extraordinary Phœnomena of this *Harveſt Moon* happen at the *Polar Circles*, where the Sun continues 24 Hours above, when in the

Winter Tropic, and 24 Hours below, the Horizon, when he is in the *Summer*, or contrary Tropic; and for the ſame Reaſon the Full Moon neither riſes in Summer *(when not wanted)* nor ſets in the Winter *(when moſt wanted)* conſidering her as in, or *near*, the Ecliptic. For, the Winter *full Moon* being as high in the Ecliptic as the *Summer*-Sun (in oppoſite Signs) muſt be viſible as long; and the *Summer* Full Moon being as low in the Ecliptic, as the *Winter* Sun (in oppoſite Signs) is below the Horizon, in the Night as he is then. Theſe are the only extraordinary *full Moons* that happen when the Sun is about the *Tropics*; all the others, at different Times, riſing and ſetting.

In *Summer*, the Full Moons are *low* and Stay but ſhort, when Nights are ſhort and Moon-Light is *leaſt* wanted. In Winter, the Full Moons go *high*, and ſtay *long*, when Nights are long and Moon-Light *moſt* wanted.

At the *Polar* Circles, Latitude 66°½, the *Harveſt-Moon*, at a Mean, riſes only an Hour later in 15 Days from her 1ſt to her 3d Quarter. But becauſe the *Obliquity* of her Orbit to the Ecliptic, and ſhifting of her *Nodes* therein, make much Alteration in her Riſing and Setting in an oblique Sphere. from what they would be if ſhe moved in the Ecliptic, the great Effect of theſe Cauſes, at the *polar* Circles, is the more remarkable as follows.

When the Moon's aſcending ☊ is in the Beginning of ♈, ſome of the 4th Part of her *Orbit* does not riſe; and while the Moon continues in that Part of her Orb, which is 4 *natural* Days, ſhe keeps below the *Horizon*; and in the oppoſite Part of her Orbit, which does not ſet, is as long above the Horizon.

In 9½ *Years*, when the *Nodes* have ſhifted round the Ecliptic, every Degree of her Orbit riſes and ſets, and ſo ſhe does here every Day of her *Age*.

When the aſcending *Node* is in ♋, the *autumnal* Moon differs but one Hour in Riſing from the 9th to the 24th Day of her *Age*, and in that Time 23 Hours in Setting; the Riſing Difference being all in the laſt 2 of theſe Days: For from the 9th to the 22d ſhe ſtill riſes at the *ſame Hour*, but changes her *Amplitude* from the South Part of the Horizon 160° Northward, paſſing the Eaſt. — When the aſcending ☊ is in the Beginning of ♑, the Moon varies her riſing *Amplitude* 180° from the South to the North Point of the *Horizon*, between the 7th and 22d Days of her Age, being ſenſibly later in Riſing for all thoſe 15 Days; and what is ſtill *remarkable*, during the 14, 15, and 16th Days of her *Age*, ſhe riſes a *Quarter* of an Hour ſooner; *contrary* to what happens at all other Times.

In the above 15 Days, ſhe varies her *Amplitude* quite through the *Weſtern* Semicircle of the *Horizon*, and retards her Setting by 24 Hours. At the *Poles* ſhe is moſtly above. the Horizon in the Sun's Abſence, and abſent when he is above the Horizon.

V. QUERE 93, *anſwered by* Cantabrigienſis.

BY cutting off the *Parts* of a correct Map, repreſenting Land, from the Parts repreſenting Water, and weighing thoſe Papers ſeparately in Scales, you will *moſt nearly* determine the Ratio of the Surface of Land to that of the Water, on our *terraqueous* Globe.

Dr. *Long* of *Cambridge*, by this Method determined (from *Senex's Globe-Papers*) the *Ratio* of the Surface of Land to that of Water, as 124 to 349 Grains; being as 1 to 3 *nearly*.

VI. QUERE 94, *anſwered by* Oxonienſis.

BESIDES our being deceived from the greater or leſs *Brightneſs* of Objects, the *Judgment* is further deceived in the greater or leſs *Magnitude* of Objects, by referring them to a greater or leſs Diſtance than they are really placed. For *Inſtance*, if an Object be beheld from low Ground, over a broad River unſeen, and be beheld from high Ground, at the ſame Diſtance, over the ſame River, with all the intermediate Space viſible, the Object being referred to greater Diſtance in the latter than in the former Caſe, will induce us to judge of it to be larger than it is, though at both Stations ſeen under the ſame *Angle*.

Hence, the Coat of Arms on the *Iron-Gate* in *Clare-Hall* Walks, *Cambridge*, being viewed oppoſite to Fields, riſing gradually beyond, till they almoſt ſeem above, the Gate, the Arms thereon being *red*, and appearing *elevated*, are ſometimes miſtaken for a *Houſe* in thoſe Fields, at a conſiderable Diſtance beyond them. See FERGUSON's *Aſtronomy*.

VII. QUERE 95, *anſwered by a* Man in Woman's Cloths, at *Chatham*.

THE *planetary* Bodies ſeen under bigger and leſs Angles appear bigger and leſs in their Magnitude, at different Times, for the ſame Reaſon that Men and other Objects appear *bigger* and *leſs*, as they are ſeen at a *leſs* or *greater* Diſtances. And therefore the Earth, on which an Obſerver of all the planetary Bodies is placed, moving in an Orbit without the Orbits of *Mercury* and *Venus*, and within the Orbits of *Mars*, *Jupiter*, and *Saturn* (which Orbits are all *elliptical* by Hypotheſis) *cauſes* the different Appearances of the *Magnitudes* of thoſe planetary Bodies, carried ſometimes at greater and ſometimes at nearer Diſtances from and to us. And the different *Poſitions* of theſe planetary Bodies, in Reſpect of the Earth and of one another, (appearing ſometimes *direct*, *retrograde*, or *ſtationary*) according to *Theory*, agreeing with Obſervation, prove the Theory of their Motions to be true.

Imperceptible Inſects cannot be made the Subject of Obſervation without being magnified; and Stars raying out Darkneſs can never enlighten an abſurd Underſtanding in Chatham *or elſewhere*.

Experience ſhews, that the Rays of Light coming from a rarer through a denſer *Medium* are refracted or bent *concave* towards the Perpendicular to the denſer refracting *Surface*, from the Point of *Incidence* of thoſe Rays; and the *contrary* is obſerved of Rays paſſing from a denſer through a *rarer* Medium, the Incident Ray is bent convex to or from the Perpendicular to the refracting Surface.

In the 1*ſt Caſe*, the Rays from the *Sun*, *Moon*, or *Stars* coming concave to the Eye of a *Spectator*, from an *æthereal Medium* through the Earth's denſer Atmoſphere, thoſe Bodies are ſeen elevated, or riſen, when they are actually *below* the Horizon; the incident Ray meeting the Eye, near the Earth's Surface, *ſhewing* them in a Tangent to the *laſt Direction* of the Ray coming in a concave Curve all the W from the Surface of the Atmoſphere to the Earth's Surface. And th more or leſs obliquely the *incident* Ray falls with the Perpendicular the Tangent of the *refracting Surface,* at the Point of *Incidence,* th greater or leſs it is found by Experience will be the Refraction; fro the *greateſt* of all in the Horizon, leſs and leſs in Altitude, to none i the *Zenith*; becauſe the *Perpendicular* to the Surface of the Atmo-ſphere, and incident Ray from the Zenith, coincide, where Experienc ſhews there is no *Refraction.* And upon the ſame Principle of Refraction it is that the *Sun, Moon,* and *Stars* appear riſen while they a actually below the Horizon, that a *Piece of Money in a Baſon* is broug in View, which without a *denſe Medium* of Water interpoſed, could no be ſeen. And in *Nova Zembla* the Sun appears to riſe 17 Days befor the Time by Calculation according to the Sphere; after a Night of Months. And Cattle feeding in *Black-Wall* Marſhes can be ſeen from *Greenwich*-Hill, near the *Thames,* in *England,* at *High* that are inviſible at *Low*-Water.

By the *Atmoſphere* reflecting the æthereal *Subſtance* of *Light* every Way, Objects become every Way round us viſible, and alſo all Parts of a ſingle Object. But without this *noble Medium* of Air, ſo neceſſary to *Viſion,* Objects could only be ſeen directly oppoſite to the Sun. For the Sun's *illuſtrious* Body itſelf could give no Light, except directly forwards, if the Air or Atmoſphere were taken away; and no Part of an Object could be ſeen but where the Sun ſhone *directly* upon it; and we ſhould be obliged to turn every *moveable Object* to the Sun to ſee all its Sides. The *Heavens* would then be dark in the Day, as now they are in the Night, and the Stars would appear. But for the Atmoſphere to *reflect* Light to us after *Sun-ſet* and before *Sun-riſe,* there could be no *Twilight*; but a ſudden Tranſition from Day-Light to *Darkneſs,* and from Darkneſs to *Day-Light,* would ſucceed each other, blinding to our Sight. — But theſe Things may not be underſtood from the *Chatham* Philoſopher's *Theory of Light,* of white Sheets and black Gowns, carried upon Hop-Poles, and the *Miller, Chimney-Sweeper,* and *Philoſopher,* ingeniouſly ſhutting one another in and out of Doors. — *Pſhaw!*

Mr. Locke's *Account of what Light is.*

“ If Light were Nothing but a Company of *Tennis* Balls which “ *Fairies,* all Day long, ſtrike with *Rackets* againſt ſome Men's Foreheads, while they paſs by others; yet the *Idea* of the Cauſe of Light “ *(if we could come at it)* would no more give the *Idea* of Light itſelf “ (being ſuch a particular Kind of *Perception* in us) than the Idea “ of the Figure and Motion of a *ſharp Piece of Steel* will give us the “ *Idea* of the *Pain* which it is able to excite in us.

“ The *Cauſe* of any Senſation, and the Senſation itſelf, in all the “ *ſimple Ideas* of one Senſe, are two *different Ideas*; and therefore it is “ very well *diſtinguiſhed* between that *Light* which is the *Cauſe* of that “ Senſation in us, and the *Idea* which is *produced* in us by it; or that “ which is properly Light.”— And Sir *Iſaac Newton* pretended not to know what the Nature of Light or Gravity were, any more than he pretended to know the Nature of any other Subſtance; only he knew that there was a real not *chimerical* Subſtance, called *Light*; and a real not *chimerical* Property of Matter, called *Gravity.*

VIII.

VIII. QUERE 96. *anſwered by Mr.* Buddle, *of* Cheſter-lee-ſtreet.

FROM repeated *aſtronomical* Obſervations, *The Squares of the periodical Times of all the Planets moving round the Sun, are diſcovered to be very nearly as the Cubes of their mean Diſtances from him*; and the ſame Proportions univerſally agree in the Motions and Diſtances of the Satellites, or Moons, revolving round their reſpective *Primaries*. Which Properties demonſtrate, that the Earth moves round the Sun, (and not the Sun round the Earth) to agree with Appearances. Therefore if the Sun moved round the Earth, according to this Law, then the Proportion would be,

As the Cube of 240 *thouſand Miles, the* ☽'*s Diſtance from* ⊖, *to the Cube of* 81 *Millions of Miles, the Earth's Diſtance from the Sun (according to an allowed* Parallax) *being as* 1 *to* 38 *Millions* 272 *Thouſand* 753, *ſo is the* Square *of the Moon's* Period *round the Earth, or* 27 *Days* 8 *Hours,* ſquared, *to the Square of the Period, in Days, of any Body moving round the Earth at the Sun's Diſtance; that is, to thirty Thouſand and* 5 *Millions* 835 *Thouſand* 352 *Days*; *whoſe* Square Root, 173 *Thouſand* 510, *is the Number of Days* required, *or* 475 *of our preſent Years, the Sun would take to revolve round our Earth, at his preſent Diſtance.*

IX. QUERE 97. *anſwered by* Urania.

THE ſtrongeſt *Proof* of the Planets being inhabited is their being attended by Moons, more or leſs, to give them Light by Reflection, in the Sun's Abſence.

For to what other Purpoſe conceivable, beſides to give Light to Beings inhabiting their *Primaries*, in the Sun's Abſence, could theſe ſeveral illuminated Attendants be created? And ſince we find, that the larger in Magnitude, or more diſtant the ſeveral Planets are from the *Sun*, (as ♃ attended with 4, and ♄ with 5 Moons) the greater is the Number of their *Attendant* ☽*s*, it is a further Argument of the Planets being inhabited; For ⊖, that is much nearer the Sun, and of the leſs Magnitude, has but one Moon to attend her Inhabitants. Every one of theſe Moons, or *Satellites*, are alſo, probably, inhabited, (that *a Multitude of Ends may be anſwered by one Work of Creation, as we before obſerved, in all God's Works)* to each of which attendant Bodies, its reſpective *Primary* ſerves alſo as a Moon.

Mr. *Alexander Rowe* remarks thus.

> *Great Reaſon ſays, nor can we doubt at all,*
> *Millions of Beings dwell on either Ball*;
> *With Conſtitutions fitted for that Spot,*
> *Where Providence all-wiſe has fix'd their Lot.*

Baker's *Univerſe*.

X. QUERE 98. *Anſwered by a* Merchant.

HONESTY is reckoned the beſt Policy, becauſe moſt Peace and Happineſs are derived from its Practice: When *contrary* Meaſures are purſued by ſome Men for Profit, they arrive at the Object of their Purſuits, *Riches*, with far leſs Enjoyment and Satisfaction of Mind, than the Acquirers of a *Fortune*, by the *Plain-ſailing-Rules* of fair Dealing and *Honeſty*, always attended with Reputation and Honour.

For grant bad Men what Happineſs they wou'd;
One they muſt want, which is to paſs for good.

XI. QUERE 99. *Anſwered by* Socius.

A BREACH of *Promiſe* is culpable more or leſs, according to the *Degree* of Diſappointment and Injury received by it. To promiſe a Perſon a particular Benefit, and diſappoint him by conferring on him a *greater*, is a *Mark* of a noble Spirit, and of great Friendſhip and Generoſity. But to promiſe a Perſon a *Benefit*, and to keep his Expectation in long and uneaſy Suſpence, without gratifying it, and fulfilling the Engagement, is very *ungenerous and cruel!*

XII. QUERE 100. *Anſwered by* Horace.

THE Favours and Affections of Mankind are found to turn upon the *Hinges* of obliging their *Maſter-Paſſion.*

Men of *Sagacity* and a noble *Diſpoſition* will allow for, and pardon, the *Frailties* and *Defects* of an Inferior; but if, for a *trifling* Offence, you fall under the Diſpleaſure of an ignoble and ungenerous ſoul'd SUPERIOR, his Hatred and Miſchief know no Bounds.

Mr. *Hicks* of the *Devizes* ſays, that the Favour and Affection of Men turn upon *Intereſt*. But tho' we grant, that *Intereſt* is predominant, or a ſtrong Maſter-Paſſion, in *many*, yet it is not found to be ſo in *all*.

PRIZE-QUERE, *anſwered by Mr.* ALEXANDER ROWE, *of* Penzance, Cornwall.

IN the Year 4712 of the *Julian* Period, CHRIST was born, according to *Clem. Alexandrinus, Irenæus, Euſebius, Epiphanius, Jerome, Croſius, Caſſiodorus,* and other *Antients* of good Authority. Which was the general Opinion till *Dionyſius Exiguus* invented the *vulgar Æra* of *Chriſt*'s Birth, two Years later. Thus Sir *Iſaac Newton*, on *Daniel, &c. p.* 135. According to *Hodgſon*'s Chronology, "the *Chriſtian Æra* "began at Noon of the thirty-firſt of *December*, immediately follow- "ing his Birth, being *Saturday* in the 4714th Year of the *Julian* "*Period.*" Agreeing with *Dionyſius Exiguus*'s Account.

☞ It ſeems *evident*, that the monthly Time of the *Nativity* of CHRIST, as placed in the *Calendar* of our common Prayer-Books, was (when the *Calendars* were conſtructed) founded upon the *beſt* Authorities; and Sir *Iſaac Newton* having ſince added his Authority for the Year, 'tis probable *Chriſt* was born in the 4712 Year of the *Julian* Period, on the 31ſt of *December*, 2 Years before the Time of the *vulgar* Æra, as Mr. *Rowe* has determined it.

*** Mr. *W. Williams*, of *Hackney*, with *great Application* has deduced the Year of the BIRTH of CHRIST, from Mr. *Mann*'s *Chronological Diſſertations*, to be on *Sunday, March* 22d in the 4707th Year of the *Julian* Period, when the Dom. Letter was D, *Roman Indiction* 12, Cycle of the Sun 3, and Golden Number 14.

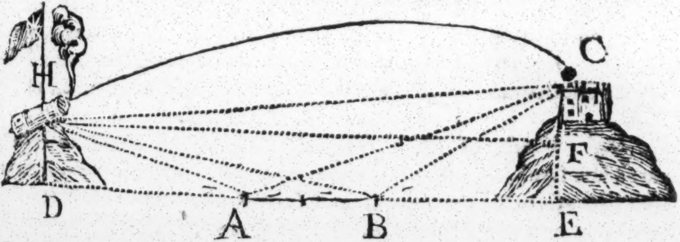
Who has as *indefatigably*, from the ſaid *chronological* Treatiſe, by *Nicholas Mann*, Eſq; late Maſter of the Charter-houſe, deduced the Time of the DEATH of CHRIST, to be on *Friday, March* 22. and *Reſurrection* on *Sunday, March* 24, in the 4739th Year of the *Julian* Period; when the Dom. Letter was F, *Golden* Number 8, *Roman Indiction* 14, *Cycle* of the Sun 7. —— We are much obliged to this

Gentleman for his indefatigable Endeavours to aſcertain the true Time of CHRIST's BIRTH and DEATH, and we ſhould have *gladly* printed his *whole Chain of the Deduction*, had Room permitted; but 'tis hoped he will excuſe us, till an Opportunity ſhall offer to print his whole Account, *hereafter*. And tho' we look upon Mr. *Mann*'s Authority far inferior to Sir *Iſaac Newton*'s, in this *Point*; we have given Mr. *Williams* equal *Chance* by Lot with Mr. *Rowe* for the *Prize Palladiums*.

Mr. *Chriſ. Maſon* makes our SAVIOUR's BIRTH to be on *Saturday*, at Midnight before the Noon of 25th Day of *December*, in the 4713th Year of the *Julian* Period, which was *Biſſextile*: The Cycle of the Sun 9, of the Moon 1, and *Dominical* Letters DC, in the 752d Year from the Building of *Rome*; the 42d Year of *Auguſtus Cæſar*; and in the Year of the Creation of the *World* 4001.—— Theſe three Accounts by Mr. *Rowe*, Mr. *Williams*, and Mr. *Maſon* are the *beſt* we have received; who are all three Competitors by Lot; whoſe Names being *fairly* wrote on three Pieces of Paper, and twice drawn by *Honorius* out of *Fidelia*'s Apron; the firſt Lot drawn of 4 Palladiums, came to Mr. *Williams* of *Hackney*; and the ſecond Lot drawn, of 2 Palladiums, to Mr. *Alexander Rowe*, of *Penzance*, *Cornwall* — *N. B.* Mr. *Maſon*'s Account is a Year before the vulgar Æra. And Mr. *Williams*'s Account in the 7th Year before.

ANSWERS to the QUESTIONS in the *Palladium*, for 1759.

I. QUESTION 146, *anſwered by the Propoſer*, Mr. Huntley.



In the Figure above,

DE repreſents the *Horizontal* Diſtance between the *Hill* and *Mountain*'s Foot.

H, the *Hill*-Top } A, the 1ſt Station.
C, the *Caſtle* } B, the 2d Station.

AB = Diſt. of the *two Stations* = 1000 Feet.

$\angle DAH = 8^\circ\ 40'$ } $\angle DBH = 6^\circ\ 45'$
$\angle EAC = 13\ \ 40$ } $\angle EBC = 17\ \ 0.$

The greateſt *Random* = 11640 Feet, = *twice* the *Impetus*, or greateſt Height.

$\angle DAH - \angle DBH = \angle AHB = 1^\circ\ 55'$ }
$\angle EBC - \angle EAC = \angle ACB = 3\ \ 20$ }

Hence, by *Trigonometry*,

Feet
S. $1^\circ\ 55'$: 1000 :: S. $6^\circ\ 45'$: AH = 3514.253.
Rad. : AH :: S. $8^\circ\ 40'$: DH = 529.5478.

Hence, EC = 1188.059.
FC = 658.5122.
AD = 3474.127.
BE = 3885.967.
DE = HF = 8360.094.
∠ FHC = 4° 30′ 13″.

By HOLLIDAY's *Principles* of GUNNERY.

As T. 45° : greateſt *Random* 11640 ::
T. ∠ Object's Elevation 4° 30′ 13″ : 916.8642 a 4th.
Horizontal Diſt. 8360.0940 add.
As gr. Rand. 11640 : Cos. Object's Elevation 4° 30′ 13″ :: 9276.9582 Sum :

Cos. 37° 23′ 21″
85 29 47
————
122 53 8
Half 61 26′ 34 Comp. Elev^{n}.
28 33 26 ∠ of lower Elev^{n}. req^{d}.

To be added to the ∠ between the *Zenith* and *Object*, for the *Double* of the Comp. of Elev^{n}.

90°
4 30′ 13″ :
————
85 29 47 ∠ between *Zenith* and *Object*.

————
But 180°
Cos. 37 23′ 21″
————
Coſ. 142 36 39
85 29 47
————
doub. Comp. 228 6 26
Comp. 114 3 13
65 56 47
the *higher* Elevation.

RULE *for* PROJECTILES *hitting Objects on Aſcents.*

As Rad : to the greateſt Random :: ſo Tangent of Object's Elevation : to a *Fourth* ; add to which the *Horizontal* Diſt. then as the greateſt *Random* : to Coſ. of Object's Elev. :: ſo the *Sum* of 4th and *Horiz.* Diſt : to Coſ. of an Angle, which *added* to ∠ between the *Zenith* and *Object*, gives the *double* of the Complement of Elevation to hit the *Object*.

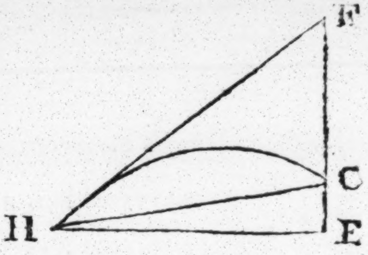
Mr. *Joſ. Wooſe*, of Mr. *Johnſon*'s School of *Hull*, ingeniouſly anſwered the ſame, by the very ſame Method. *Cheſterfieldienſis* makes the two Elevations 28° 25′ 25″, and 66° 6′ 6″, making DE the Hor. Diſt. = 8320.096 inſtead of 8360,094 ; but gives the Caſtle's Height, CE, and Hill's Height DH the ſame as Mr. *Huntley*. And from Number 179 *Philoſ. Tranſactions* gives this *Theorem* for finding the *Tangent* of

Elevation $= t = \frac{p}{2b} \mp \sqrt{\frac{p^2 - 4pb}{4b^2} - 1}$ according to Dr. *Halley*

(where p = the *Parameter* = double the greateſt Random ; b = the *Horizontal* Diſt. b = Height of the *Object* above the *Level* of the Cannon, Rad. = 1) —— Mr. *Alexander Rowe*, of *Penzance*, *Cornwall*, after determining the preceding *Requiſites* very correctly, he as correctly finds the two Elevations, 28° 33′ and 65° 57′ to hit the Caſtle.

Mr. George Brown, *writing and* mathematical *Maſter at Portſmouth-Common, anſwers the ſame, as follows.*

PUT $a = 16\frac{1}{12}$ Feet, $b = 11640$, the Projectile's *greateſt* horizontal Random. Then, 'tis known $\sqrt{2ab}$ = the *Projectile*'s Velocity ty in 1 Second. But per Queſtion and *Trigonometry*, HE $= 8360{,}388$ $= c$; EC $= 658{,}6119 = d$; x = Time of the Projectile in Motion. Then, CF $= ax^2$, and EF $= d + ax^2$; but $1^s : \sqrt{2ab} :: x : \text{HF} = x\sqrt{2ab}$. Then per 47. E. 1. $c^2 + \overline{d + ax^2}|^2 =$ abx^2; conſequently $x^2 = \frac{b - d \pm \sqrt{b^2 - 2bd - c^2}}{a}$; and by Trig.



$$: b \pm \sqrt{b^2 - 2bd - c^2} :: \text{Rad. } 1. : \frac{b \pm \sqrt{b^2 - 2bd - c^2}}{c} = 2{,}24026$$

nd ,54429, the Tangents of 65° 56′ 42″ and 28° 33′ 32″, the re- uired Angles of *Elevation*.

See Jones's *Synopſis Palmariorum*, P. 296, *of the Motion of Pro-* ctiles. *See alſo* Emerſon's *Principles of Mechanics*, 2d Edition, *from* age 24 *to* 29.

☞ We ſhall give all the RULES of Projectiles (conciſely) here- ter.

II. QUESTION 147, *anſwered by* Cheſterfieldienſis.

PUT x = 1ſt Term, then by geometrical Progreſſion, the laſt Term the *Series* will be $x \times 2^{51}$, the *Ratio* being 2; conſequently the *Sum* all $= x \times 2^{52} - x = 50000 = s$. Hence $x = \frac{s}{2^{52} - 1} = \frac{48000000}{3599627370495}$, the Fraction of 1 Farthing, which is the 1ſt yment. And the laſt Payment is 25000 *l.* $= 24000000$ Farthings d $\frac{24000000}{4503599627370495}$ *fractional* Part of a Farthing. Q. E. I.

Mr. *Thomas Huntley* ſolved it in the ſame *elegant* Manner, but in ain Diction, the Reſult being exactly the ſame.

Mr. *Joſeph Woofe*, of Mr. *Johnſon*'s School, in *Hull*, ſolved it ewiſe by the ſame Method, very *correctly*; as did Mr. *John Buddle*, *Cheſter le Street*, near *Durham*; Mr. *George Brown*, Mr. *Edward* s, at Mr. *Hicks*'s School, at *Reedneſs*, near *Howden*, *Yorkſhire*.

Mr. Alexander Rowe's *Solution is thus.*

$$\text{If}\left\{\begin{array}{l} a \\ r \\ n \\ l \\ s \end{array}\right\}\text{ denote }\left\{\begin{array}{l} \textit{First Term} \\ \textit{Ratio} \\ \textit{Num Terms} \\ \textit{Last Term} \\ \textit{Sum Terms} \end{array}\right\}\begin{array}{l} \cdot\;\cdot\;\cdot\;\cdot\;\cdot \\ r = 2 \\ n = 53 \\ \cdot\;\cdot\;\cdot\;\cdot\;\cdot \\ s = 50000. \end{array}$$

Then, $a = \dfrac{sr - s}{r^n - 1} = 0$, nearly.

$$l = \frac{sr^n - sr^{n-1}}{r^n - 1} = 25000\,l. \text{ nearly.}$$

See Jones's *Synopſis Palmariorum Matheſeos*, P. 202.

III. QUESTION 148, *anſwered by the* AUTHOR.

By Page 148, *Royal Aſtronomer and Navigator*, the Dominical Letters, at Sight, in the 585th Julian Year current before Chriſt, (always deducting 1 for Years before Chriſt) were FE, it being *Biſſextile.* And, by Page 149, *May* 28, that Year, anſwering to E, wa on a *Wedneſday, (and not on a* Monday, *as in* Brent's *Aſtronomy)* whe the Battle was put an End to, after an *Eclipſe*, and Peace enſu betwixt the *Medes* and *Lydians*. By Page 168, *Royal Aſtronomer*, th Days of New Style in 585th Year, before Chriſt, were backward of th Old by 6; according to this RULE;

Before Chriſt, take the Fourth *from the Hundreds — that done —*
Then add 2, and the Difference of Style will be known.

Thus, 5 Hundreds — their $\frac{1}{4}$, or — 1 = 4, to which adding 2, th Sum = 6 Days, the *New Style* was then before the *Old*, in Reſp of the Month-Day. — Hence the 28th of *May*, O. S. was the of *May*, N. S. in the 585th Year, current before Chriſt.

To find the Epact for any Year before or ſince Chriſt, O. S.?

RULE. Multiply the *Golden* Number for the Year by 11, a divide by 30, (if the Product is above) and the Remainder will the *Epact* for that Year, O. S. required.

Or, adding the Number of Days *Difference* between Old and Ne Style to the Epact, in Years before Chriſt, or ſubtracting them the from (or after 30 be added) in Years ſince Chriſt, (according as th Month-Day of New Style is before or after the Month-Day of O Style) and the *Sum* or *Remainder, reſpectively*, will be the *Epa* New Style, *required.*

By *Table*, Page 150, *Royal Aſtronomer*, the Golden Number for before Chriſt (always deducting 1 for Years before Chriſt) is 6, wh multiplied by 11, and divided by 30, the Remainder is 6, the E for 585, O. S. And the Difference of Days between Old and N Style being then 6, (the Month-Day of New is before the Mo Day of Old Style) add them to 6, the Epact, O. S. the Sum i the *Epact* for New Style, 585. — NOTE, *The* Epact *for New St always as much* more *or* leſs *than the* Epact *for Old Style, as the M Day of the New Style is* leſs *or* more *than that of the Old, and the co trary, for Old from thoſe of New Style.*

For the Days Difference of the Moon's Age (which is governed by *Epact)* add, *when the Number of Days Difference of the Month-D* ſubtract, *to and from thoſe of Old, for thoſe of New Style: And the Month-Day adds, the Moon's Age ſubtracts, to and from thoſe of for thoſe of New, Style. And the contrary in thoſe of the New, fo of the Old, Style.*

The Cycle of the *Moon* is ſeen to be 6 for New and Old Style in the 85th Year before Chriſt.

And the Cycles of the *Sun*, and *Indiction*, are 13, and 4.

☞ The *Dominical Letters* for 585, before Chriſt, N. S. are GF, y *Table*, Page 149, *Royal Aſtronomer*, (always deducting 1 Year for Dates before Chriſt) where ample Satisfaction is had, and Rules for e whole Buſineſs of Chronology.

To find the Cycle of the Sun before Chriſt.

RULE. Divide by 4 Sevens — The Date and 18,
Take what's left from 4 Sevens — the Cycle is ſeen.

To find the Indiction before Chriſt.

RULE. Divide by 15 — the Date and 11,
Take what's leſt from 15 — the *Indiction* is given.

The 1ſt Day of the *Egyptian* Year in the Month *Thoth*, happened n the 26th of *February*, in the 746th Year current before Chriſt, *Ju*an Style; being the Æra of *Nabonaſſar*, (ſee Page 157 of our *Royal ſtronomer)* from whence to *February* 26, 585, before Chriſt, there re 161 *Egyptian* Years and 40 Days, and from *February* 28 to *May* 8, are 92 Days more (585 being Leap-year). Hence there are 161 gyptian Years and 132 Days from the 1ſt of the Month *Thoth*, aking the 12th Day of the *fifth Egyptian* Month *Tybi*, required, orreſpondent to the Julian Date given. *(See Page 141, Royal Aſtromer.)*

Mr. *Huntley* has determined the Golden Number and Epact, Domiical Letters, Cycle of the Sun, and Indiction, for Old Style, the ame as above; as did Mr. *W. Williams*, of *Hackney*.

IV. QUESTION 149, *anſwered by Mr.* Alexander Rowe.

By falſe Poſition, Sir, it plain appears,
Your Friend is aged ſeven and forty Years.

Anſwered by Mr. George Brown, *of* Portſmouth.

PUT $x =$ Mr. *Stapley*'s Age, then $1758 - x =$ Year of our ord he was born in; and per Queſt. $1759x - x^2 = 80464 = m$; $= 1759$.

Whence, $x = \frac{b \pm \sqrt{b^2 - 4m}}{2} = 1712$; and 47 Years his ge.

By *Cheſterfieldienſis.* Put $p = 1758$, and $x =$ his Age *ſought*; then $p - x =$ the Year he was born in: and $px - x^2 + x = 80464$ $= s$. Put $p + 1 = 2d$, then $x = \pm \sqrt{d^2 - s} + d = 47$ Years, is Age.

By Mr. *Joſ. Wooſe*, of *Hull.* Put $x =$ Year he was born in, $y =$ Year when the Queſtion was propoſed; then $y - x =$ his Age; put $= 80464$;

Then, $\overline{y - x} \times x, + y - x = a$ or $y - x \times \overline{x + 1} = a$;

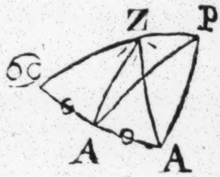
whence $y - x = \frac{a}{x + 1} = 47$ Years, his Age, (a Rule of *Trial.*)

Explicatio à Dom. Thom. Huntlèio. *Eſto Quantitatis* $x =$ *Au* *Ætati*, $a =$ *Anno nuperrimè completo*, viz. 1758, $s^2 = 80464$, e *Conditione Problematis*, $\overline{a-x} \times x, + x = s^2$; *ſit autem Brevitatis G* *tiâ*, $a + 1 = c$, *dein Subſtitutione et Reductione factâ*, *prodit* $x = \frac{1}{2}c$ $\sqrt{\frac{1}{4}c^2 - s^2} = 47$.

Mr. *Robert Romney*, Pupil to Mr. *George Hicks* of *Reedneſs*, in *Yo* *ſhire*, elegantly anſwered the ſame in *Latin* Diction. Mr. *Thomas H* alſo ſolved it, as did Mr. *Edward Ellis*, Mr. *Thomas Sadler*, and ſev ral others. But we have inſerted the principal Methods of Solutio for the *Analyſt*'s Satisfaction.

V. QUESTION 150, *anſwered by the* Indefatigable Cheſterfieldien

IN *Palladium*, 1757, the Sun's Declination, *May* 12, was 18° 1 N. whoſe natural Sine call d; its Coſine c; the ∠ ♋ZA = the Sun's Azimuth at 2d Obſervation = 46° 15′; and ∠ ♋ZA, the Sun's Azimuth at 1ſt Obſervation = 77° 20′; and ∠ APA = 2 Hours = 30°. *Then*, in ∠ APA, you have given AP = AP = ♋P = 71° 41′; and included ∠APA = 30°, to find AA = 28° 26′ 50″; and ∠ A♋P = ∠ AAP = 85° 27′ 57″. *Again*, put x = Sine ♋A, and its Coſine $\sqrt{1-x^2}$; g = Coſ. ∠ A♋P, Then, by a known *Theorem* $xgc + d\sqrt{1-x^2}$



$$= d; \text{ hence } x = \frac{2dgc}{d^2 + c^2 g^2} = ,4776333, \text{ and } ♋PA = ,501339$$

anſwerable to 30° 5′ 19″, or 2ʰ 0ᵐ 21ˢ of Time from Noon, th Time of 2d Obſervation: And 4ʰ 0ᵐ 21ˢ from *Noon*, the Time of 1 *Obſervation*.

By Spherics, As Rad. : Tan. AZ, 41° 12′ 47″ :: Coſ. ∠AZ♋, 43° 45′ : Tan. 31° 12′ 4″.

As Tan. 30° 5′ 19″ : Sine 31° 12′ 4″ :: Tan. 46° 15′ : Sin ♋° 3′ 44″.

Now, ♋° 3′ 44″ — 31° 12′ 4″ = 37° 51′ 40″, Compleme of Latitude. Whence the Lat. 52° 8′ 20″. Q. E. I.

Mr. *John Buddle* gave the ſame Method of *Solution*, but found no Numbers.

VI. QUESTION 151, *anſwered by the* AUTHOR *of the* Royal Aſtronomer *and* Navigator.

OUR Correſpondent informing us of a Miſtake, of 1759 printe for 1760, and other Blunders, we have rectified them.

☽ paſſes *Paris* Merid.		☽'s Declin.		☽'s *Place.*	
20ᵈ 8ʰ 46ᵐ	52ᵐ Dif.	23° S. 33′	2° 47′ Dif.	1° ♒ 38′	12° 47′ Di
21 9 38		20 46		14 25	

See *De la Caille's Ephemerides*, *Sept.* 1760.

Say, 360° : 12° 47′ Dif. ☽'s Place :: 71° 10′ W. from *Pari* 2° 32′ Dif. ☽'s Place at N. *England*.

Se

	At *Paris*.		☽'s Pl. at N. *Eng.* Noon.	
Sept. 20	1° ♒ 38′	+ 2° 32′ =	4° ♒ 10′	12° 47′ Dif.
Noon 21	14 25	+ 2 32 =	16 57	

Again, As 360° : 52m ☽'s later Southing :: 71° 10′ : 10m 17s Southing, later at *N. England*.

Sept.			
20d 8h 46m	+ 10m 17s	= 20d 8h 56m 17s	☽ paſſes *N. Eng.* Meridian.
21 9 38	+ 10 17	= 21 8 48 17	

Incr. ☽ Pl. Incr. ☽ Pl. ☽ Pl.

Again, 24h : 12° 47′ :: 8h 56m 17s : 4° 45′ } Whence { 8° ♒ 55′

9 48 17 : 5 13 } { 22 10

When the ☽ ſouths [at *N. Eng.*

Decr. ☽ Decl. Decr. ☽ Decl. ☽ Decl.

And 24h : 2° 47′ :: 8h 56m 17s : 1° 2′ } Whence { 21° S. 58′

9 48 17 : 1 8 } { 19 5

When the ☽ ſouths [at *N. England*.

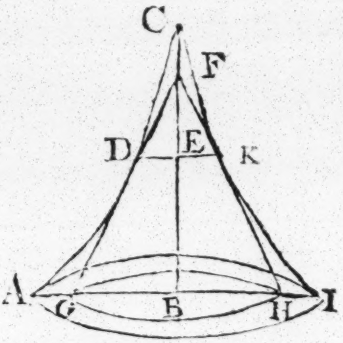
Alſo, 360° : 2° 47′ :: 71° 10′ : 33′. Whence, *Sept.* { 20d { 23° S. 0′ 2° 47

{ 21 { 20 13

at *Noon*.

☞ *The above Solution* is all that could be *meant*, or was indeed conſiſtent; however 1759 came to be *ſent us for* 1760, and *January the* 8*th* printed *for September the* 20*th*. So that if Contributors do not ſend *Solutions* with their *Queſtions* for the future to prevent *Blunders* and *Abſurdities*, they will not be inſerted.

VII. QUESTION 152, *anſwered by Mr.* GEORGE BROWN, *of* Portſmouth-Common.



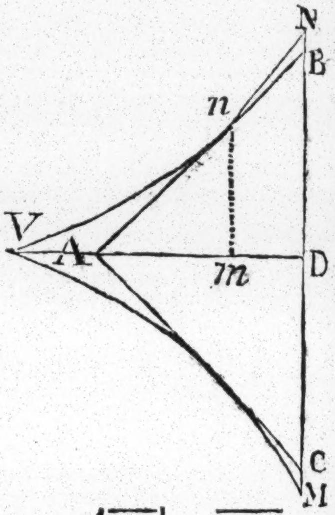
LET CB $= 50 = b$, BA $= 35 = c$, $p = ,7854$, and the *Equation* of the Curve, and the Equation of the Curve CDA is $ax^3 = y^2$. Then, FE $= \frac{2}{3}x$, and IB $= \frac{3b - x}{3}$;

Then, as EF : ED :: FB : BG $= \frac{3b - x\sqrt{ax}}{3}$; $\therefore \frac{pax}{9} \times \overline{3b-x}|^3$ = Solidity of the Cone DGHKF, which, *per Queſt.* muſt be a *Maximum*, or $3bx^{\frac{1}{3}} - x^{\frac{4}{3}}$ *Maximum.* In Fluxions, $\frac{b\dot{x}}{x^{\frac{2}{3}}} - \frac{4}{5}x^{\frac{1}{3}}\dot{x} = 0$; whence $x = \frac{3}{4}b$;

$\frac{3}{4}b$; conſequently, $BF = \frac{3}{4}b = 39.5$; $GH = \frac{9c}{8}\sqrt{3} = 68.1995$;

and Solidity $\frac{243}{256}pbc^2 = 45662.87988$. Q. E. I.

The PROPOSER'S SOLUTION, *Mr.* John Thomſon's, *of* Wetherby Bridge, Leiceſterſhire.



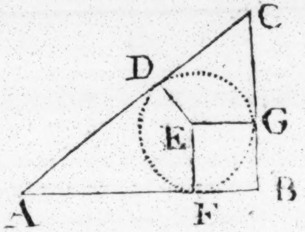
THE *Subtangent* A*m* will be found to be $\frac{2}{3}$ of the *Abſciſſa* V*m*, therefore the Curve is convex towards its *Axis*.

Hence, putting $VD = 50 = a$, $DN = 35 = b$, and $Vm = x$, then $VA = \frac{x}{3}$ ∴ $AD = a - \frac{x}{3}$ and (*per Curve*) $a^3 : b^2 :: x^3 : \frac{b^2x^3}{a^3} = \overline{nm}|^2$ ∴ $b\sqrt{\frac{x^3}{a^3}}|$ $= nm$, and (*per* ſim. △s) $\frac{2x}{3} : b\sqrt{\frac{x^3}{a^3}}| :: a - \frac{x}{3} : BD = b\sqrt{\frac{x^3}{a^3}}| \times \overline{\frac{3a}{2x} - \frac{1}{2}}$ ∴ $BC =$ $\frac{bx}{a}\sqrt{\frac{x}{a}}| \times \overline{\frac{3a-x}{x}} = \frac{b}{a}\sqrt{\frac{x}{a}}| \times \overline{3a-x}$, and $\overline{BC}|^2 =$ $\frac{b^2x}{a^3} \times \overline{\overline{3a-x}}|^2$ ∴ $x \times \overline{\overline{3a-x}}|^2 \times \overline{3a-x}$ or $x \times \overline{\overline{3a-x}}|^3$ is a *Maximum*; which fluxed and reduced gives $x = \frac{3a}{4} = AD =$ $37{,}5$, $BC = \frac{9b}{8}\sqrt{3}| = 68{,}1975$, and the *Content* $= 4566$ $,9203$. W. W. R.

The *Maximum* of Solidity by *Cheſterfieldienſis* being but 27059.48 we therefore omit his Solution.

VIII. QUESTION 153, *anſwered by Mr.* Alexander Rowe.

GIVEN AC $= xx$, DE $=$ FE $=$ GE $= 3x$; AC $+$ 2DE $=$ AB $+$ CB $= x^2 + 6x$; Then AC$^2 =$ $\frac{\overline{AB+CB}^2}{2} +$ AC; *i.e.* $x^4 = \frac{\overline{x^2+6x}|^2}{2} + xx$;



Whence, $2x^4 = \overline{x^2+6x}|^2 + 2x^2$; and by *Reduction*, $x^2 - 12x = 38$; but *becauſe* x is to be a whole Number, *&c.* $x^2 : 12x :: 5 : 4$; from whence $x = 15$ (the leaſt whole Number). And thence AC $= 225$; AB $= 180$; and BC $= 135$, anſwering the Conditions of the Queſtion. Q. E. I.

Cheſterfieldienſis ſolved the ſame Queſtion by another Method; but not ſo *general*. He found the Value of the *Hypothenuſe*, leſs and greater Legs, the ſame as above. Mr. *Joſeph Wooſe*, of Mr. *Edward Johnſon*'s School, at *Hull*, ſolved the ſame; as did ſome others.

IX. QUESTION 154, *anſwered by* Cheſterfieldienſis.

PUT x for the leaſt Side, $x + e$ for the next Side, $a + 2e$ for the greater Side, then, by the *Queſtion*, as $x^2 + xe : x^2 + 3xe + 2e^2 :: 1 : 3$, or which is the ſame $x : x + 2e :: 1 : 3$; hence, $a = e$; conſequently the 3 Sides are x, $2x$, and $3x$. By the *Queſtion*, $6x^3 \times 6x^3 \times 6x^3 = 2176782336$; whence $x = \frac{\overline{2176782336}|^{\frac{1}{9}}}{216} = 6$; and the other Sides 12 and 18.

☞ *But becauſe the Sum of the two leſs Sides are equal to the greater, his Triangle cannot exiſt. Which Diſcovery therefore anſwers the Trouble f propoſing the Queſtion.*

Mr. *Rowe* anſwered this *Queſtion*, and made the ſame Obſervation; s did Mr. *John Buddle*, Mr. *Robert Romley*, Mr. *Edward Ellis*, Mr. *Joſeph Wooſe*, and others. Mr. *Huntley* amended the *Conditions*, and olved it very curiouſly, as follows.

Fiat $x =$ *lateri primo ſeu minimo trianguli* $x + z =$ *ſecundo ſeu Medio*, $x + 2z =$ *tertio ſeu maximo, tum per conditionem problèmatis ſecundum aptè emendatam* (liquet enim typorum diſpoſitio rem in errorem heic ncidiſſe) $x \times x + z : x + z \times \overline{x+2z} :: 1 : 2 \therefore 2x^2 + 2xz = x^2 + 3xz + 2xx$. *Unde* $x = \frac{1}{2}z + \sqrt{\overline{\frac{1}{4}x^2 + 2z^2}} = 2z$, *quare* $x \times 1\frac{1}{2}x \times 2x = 3x^3 = \overline{2176782336}|^{\frac{1}{3}}$. *Diviſione factâ et radice ubique extractâ, prodit* $x = \overline{80621568}|^{\frac{1}{3}} = 7,559525$; *ideoque* $x + z = 11,339287$, *et* $x + 2z = 15,119049$.

Inventis nunc ſingulis trianguli lateribus, capacitas agelli, ope ſcilicet merſonii *clariſſimi theorematum* 7$^{\text{mi}}$ *et* 13$^{\text{i}}$ Lib. II. *facillimi ſic eruitur.*

1 : ,6875 :: S. 90° : Coſ. 46° 34′ 3″.

S. 90° : S. 46° 34′ 3″ :: $x^2 = 57,14645 : 41,49886$.

Ut : *quadratis, ſive* 4 *jug. et* 25 *perticis.* Q. E. I.

X. QUESTION 155, *anſwered by* Cheſterfieldienſis.

FIRST, As 9 Inches : 58 Stitches :: 133 Inches Length (= 3 yds. 2 *feet*, 1 *inch.*) : $857\frac{1}{9}$ Stitches, in 1 *Row*. Now, 28 Inche Breadth (= $\frac{1}{2}$ yard and 10 inches) divided by ,4 gives 70 Sides of □s, being 1 leſs than the *Rows*, in Breadth, as well as Length. *There-fore*, $857\frac{1}{9}$ *Stitches* in Length, by 71 *Rows* in Length gives 60854 Stitches in Length.

Again; As 9 Inches : 58 Stitches :: 28 Inches Breadth : $180\frac{4}{9}$ Stitches in Breadth, which multiplied by the *Rows* in Breadth 333 (= 133 Inches ÷ ,4, adding 1 to the *Quote*) and the Product is $60178\frac{2}{9}$, the Stitches in Breadth, which added to $60854\frac{8}{9}$, the Stitches in Length make $121033\frac{1}{9}$ Stitches in the *Petticoat*. Now, As 100 *Stitches* : 25*l.* :: $121033\frac{1}{9}$ *Stitches* : 30*l.* 5*s.* 2*d.* *nearly*, the Coſt of the Job. Q. E. I.

Mr. Alexander Rowe *ſolves it thus.*

133 (Inches the Length) × 28 (Inches in Breadth) = 3724 ſquar Inches, the *Area*; which ÷ ,16 the Area of 1 quilted Square, the *Quotient* is 23275 the Number of *quilted Squares* in the whole Work; each of which Squares being wrought ,4 in Length and Breadth, ,8 is to be counted for Work in *every Square*, beſides the *half Circuit*, at the Border, or Length and Breadth to be *added*. — Now, 23275 × ,8 = 18620 Inches of Work in all the Squares; to which adding 13 + 28 = 161 Inches for the half Border, and the *Sum* = 18781, *wrought Inches.*

As 9 : 58 :: 18781 : $121033\frac{1}{9}$ *Stitches* of Work, as before.

☞ *The* French *Quilting may amount to* 10 *Guineas*; *but extraordinar Stitching amounts to more, for Ladies. And why not* 30*l. for a* Petti-coat, *as well as* 50 *for a* Head-Dreſs?

Mr. *John Buddle* anſwered the ſame *very conciſely*. Mr. *Robert Romley*, Mr. *Edward Ellis*, both of Mr. *Hicks*'s School, at *Redreſs*; and ſome others.

XI. QUESTION 156, *anſwered by Mr.* John Buddle, *of* Cheſter le Street, *near* Durham.

LET the Ages of *Scurrilla*, *Clamora*, and *Clangoſa*, be repreſented by x, y, and z.

$$
\begin{array}{r|c|l}
\text{Then,} & 1 & \left.\begin{array}{l} xx + zz - 2zy + yy = 754 \\ yy + zz - 2zx + xx = 1394 \\ zz + yy - 2yx + xx = 1664 \end{array}\right\} \text{per Queſtion.} \\
 & 2 & \\
 & 3 & \\
2 - 1 & 4 & 2zy - 2zx = 640;\ \because zy - zx = 320. \\
3 - 2 & 5 & 2zx - 2yx = 270;\ \because zx - yx = 135. \\
3 - 1 & 6 & 2zy - 2yx = 910;\ \because zy - yx = 455. \\
\text{By } 6. & 7 & y = \dfrac{455}{z - x}. \\
5. & 8 & y = \dfrac{zx - 135}{x}.
\end{array}
$$

$y = 8$	9	$\frac{455}{z-x} = \frac{zx-135}{x}$.

Years.

By a few Trials, the Value of x is found $=$ 27 *Scurrilla*'s } Age.
Whence, 35 *Clamora*'s
40 *Clangoſa*'s

Enodatio, à Dom. Huntleio.

	1	$x^2 + y^2 - 2yz + z^2 = 754$ } *per Data.*
	2	$y^2 + x^2 - 2xz + z^2 = 1394$
	3	$z^2 + y^2 - 2xy + x^2 = 1664$
$2-1 \div 2$	4	$2yz - 2xz = 640$, *et* $yz - xz = 320$.
$3-2 \div 2$	5	$2xz - 2xy = 270$, *et* $xz - xy = 135$.
$4 \div \overline{y-x}$	6	$z = \frac{320}{y-x}$.
5 trans x $\div x$	7	$z = \frac{135-xy}{x}$.

His valoribus z inter ſe æquatis, et æquatione concinnatâ, obtinemus hanc, $x^2 - yx + \frac{455}{y}x = 135$.

Ex equatione primâ liquet, quantitatem x non excedere $\sqrt{754} = 27$, *nec quantitatem y ſuperare* $\sqrt{1394} = 37$: *Oportet ergo valorem y intra hos limites exiſtere; debet porro valor y eſſe numerus integer ſolus autem numerus, nec minor* 7, *nec major* 37, *per quem* 455 *dividi poteſt, eſt* 35; *valor y ergo erit* $35 =$ *ætate* Clamoræ; *qui numerus ſubſtitutus in* æquatione *noviſſimâ, exhibet hancce* $x^2 - 35x + 13x = 135$, *unde prodit* $x = 27 =$ *ætate* Scurrillæ, *et* $z = 40 =$ *ætate* Clangoſæ. Q.E.I.

Anſwered by Mr. George Brown, *of* Portſmouth-Common.

PUT x, y, and v, the Ages of the three Vixens, *Scurrilla*, *Clamora*, and *Clangoſa*.

Then per Queſt.	1	$x^2 + \overline{y-v}\vert^2 = 754 = a$.
	2	$y^2 + \overline{x-v}\vert^2 = 1394 = b$.
	3	$v^2 + \overline{x-y}\vert^2 = 1664 = c$.
Whence	4	$2yv - 2xv = b - a$.
But	5	$v^2 \times \overline{x-y}\vert^2 = c$.
Then	6	$\overline{x-y}\vert^2 = c - v^2$.
And	7	$v^2 + \overline{x-y}\vert^2 + 2yv - 2xv = c + b - a$.
Therefore	8	$x + y - x = \sqrt{c+b-a}$.
And	9	$\overline{x-y}\vert^2 = \overline{v - \sqrt{c+b-a}}\vert^2$.
Conſeq.	10	$\overline{v - \sqrt{c+b-a}}\vert^2 = c - v^2$.
Or	11	$v^2 - v\sqrt{c+b-a} = \frac{a-b}{2}$ ∴ $v =$

$$\frac{\sqrt{c+b-a} + \sqrt{c+a-b}}{2} = 40.$$

From what is done above,

$$\left.\begin{array}{l}\text{Years.}\\ x = 27\\ y = 35\\ v = 40\end{array}\right\}\text{ Age of }\left\{\begin{array}{l}\textit{Scurrilla.}\\ \textit{Clamora.}\\ \textit{Clangoſa.}\end{array}\right.$$

All abounding in *Excellence!* of which Mr. *Hammond* may take his Choice!

Thus, Mr. *Brown* has curiouſly wrought out the *final* Equation, by a *Quadratic* only.

Curiouſly anſwered by Mr. WOOFE, *at Mr.* JOHNSON's *School, in* Hull.

PUT x, y, and z, for the Ages of *Scurrilla*, *Clamora*, and *Clangoſa*.

Then *per* Queſt.

$$\left.\begin{array}{ll}1 & x^2 + z^2 - 2yz + y^2 = 754 = a\\ 2 & y^2 + z^2 - 2zx + x^2 = 1394 = b\\ 3 & z^2 + y^2 - 2xy + x^2 = 1664 = c\end{array}\right\}$$

2 − 1

$$4\quad 2yz - 2zx = b - a \therefore y - z = \frac{b-a}{2z} \text{ and } \overline{y+z}\,\big|^2 = \frac{\overline{b-a}\,\big|^2}{4z^2}$$

3 − 1

$$5\quad 2yz - 2xy = c - a \therefore z - x = \frac{c-a}{2y}, \text{ and } \overline{z-x}\,\big|^2 = \frac{\overline{c-a}\,\big|^2}{4y^2}$$

In 1, 2, 3, ſubſtitute for Equals.

$$6\quad x^2 + \frac{\overline{c-b}\,\big|^2}{4x^2} = a;\ y^2 + \frac{\overline{c-a}\,\big|^2}{4y^2} = b;\ z^2 + \frac{\overline{b-a}\,\big|^2}{4z^2} = c$$

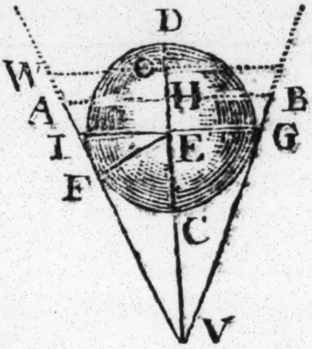
6 reduced.

$$\left.\begin{array}{ll}7 & x = \sqrt{\dfrac{a}{2} \pm \sqrt{\dfrac{a^2}{4} - \dfrac{\overline{c-b}^2}{4}}} = 27 \text{ Yrs.}\\[2ex] 8 & y = \sqrt{\dfrac{b}{2} \pm \sqrt{\dfrac{b^2}{4} - \dfrac{\overline{c-a}^2}{4}}} = 35\\[2ex] 9 & z = \sqrt{\dfrac{c}{2} \pm \sqrt{\dfrac{}{4} - \dfrac{\overline{b-a}^2}{4}}} = 40\end{array}\right\}\text{Age of}\left\{\begin{array}{l}\textit{Scurrilla.}\\[2ex] \textit{Clamora.}\\[2ex] \textit{Clangoſa.}\end{array}\right.$$

Mr. *George Hicks* of the *Devizes* anſwered the ſame; as did Mr. *George Stapley* the Propoſer, *Cheſterfieldienſis*, and ſome others.

XII. QUESTION 157. *Anſwered by Mr.* Alexander Rowe.

LET DC repreſent the Diam. of the *Ball* $= 4$ Inches $= a$; EC



at Part of it $=$ the Altitude of the ater, after the *Ball* is put into the laſs, $= x$; AB, the Diam. of the laſs $= 5$ Inches $= b$; Content the *Water*, in the Glaſs $= 19.635$. Inches, $= c$, and $,7854 = d$. hen, ED $= a - x$; and *per* the cle's *Property*, DE $\times$ EC $=$ EG^2, at is, $ax - x^2 = \square$ of the Radius the *Plane of the Section of the Ball*, t the Place of *Immerſion* in the Wa- r; the *Area* of which Plane $=$ $ax - 5dx^2$, which divided by $\dot{x}$, $=$ $dax\dot{x} - 5dx^2\dot{x} =$ *Fluxion* of the all's Segment *under Water*; whoſe *Fluent* is $2.5dax^2 - \frac{5}{3}dx^3 + c$ $= db^2x$, *nearly* (in the preſent *Caſe*) $\because$ $\frac{5}{3}dx^3 - 2.5dax^2 + db^2x =$

; whence, $x^3 - 1.5ax^2 + \frac{3}{5}b^2x = \frac{3c}{5d} = 15$; from which,

$= 2.33$ Inches, *ferè*. Q E I.

he *ſame anſwered by Mr.* George Brown, *Mathematical and Writing Maſter, at* Portſmouth *Common.*

PUT $p = ,7854$; As AH ; AV :: ($2.5 : 6.5$) $c : b$; **FE** $= 2$ ches $= d$; VH $= 6$ Inches $= n$; C $o = x$, the Height of the gment immers'd (*ſuppoſing the Sides of the Glaſs continued above the* p, AB) V$o = y$, the Water's Height by the Ball's Immerſion. *ere the Water is ſuppoſed to be above the Top of the Glaſs which erwiſe may be conſidered as a Column of the Height* Ho, *running over*)

By ſimilar Δs $c : b :: d :$ VE $= \frac{db}{c} = 5.2$; then, E$o = y -$

$\frac{bd}{c}$; and C$o = x = d + y - \frac{bd}{c} = y - 3{,}2 = y - m$, or $y =$

$+ x$ (where $m = 3.2$.) By a *common Rule* $\frac{4p}{3} \times \overline{3dx^2 - x^3} =$

lidity of the Segment *immerſed*. And $n : c :: y : cw = \frac{cy}{n}$.

hen the Content of the *conical Space*, from the Bottom of the *Glaſs*, to cw, above the Top of the Glaſs BA, $= \frac{4pc^2}{3n^2} \times$

$\overline{dx^2 - x^3} + \frac{2pc^2n}{3} = \frac{4pc^2}{3n^2} \times \overline{m + x}|^3$; whence $84.5x^3 -$ $x^2 + 384x = 940.4$; ſolved $x = 3.33104376242 8$ Inches, true to the laſt *Figure,* the required Height of the Segment of the B Co, immerſed in the Water, (*if the Height of the Column,* Ho, *abo the Glaſs be not run over ?)* and therefore Vo $=$ 6.531043762428 I the Height of the Water, *if the Sides of the Glaſs were continued.*

We leave the Difference of theſe Solutions to be examined.

Cheſterfieldienſis ſubſtitutes x for the Height of the Water's Surfac from the Bottom of the Glaſs, after the Immerſion of the Ball Segment; and Proportions thus; As 6 Inches, the Glaſs's Heigh 5 Inches its Diameter :: x : $\frac{5}{6}x$ Inches Diameter *for* $\frac{1}{2}$ *the Glaſ Content* — But is the Diameter (*as we conceive)* for the Glaſs's Co tent to the Top of the Water's Surface being above half the Glaſ Content, by as much as the *immerſed Segment* exceeds $\frac{1}{2}$ the Conten *We therefore omit this Solution.*

XIII. QUESTION 158. *Anſwered by* Morris Muckworm, Eſq;
Exchange-Broker.

Original Debt 500 *l.*
Paid down 1 1

Remaining *Debt* 498 19

Hence at the End of

Years.	Payments.		Preſ. Worth.		
1	*l.* 3	3 *s.*	*l.* 3	0	0
2	9	9	8	11	5,14
3	28	7	24	9	9,55
4	85	1	69	19	5
5	255	3	199	18	4
5.247 &c.	117	16	91	3	10,50
Whole Debt	498	19	397	2	10,19

According t the Theorem in the follow- ing Page.

Whole preſent Worth requir

In a *Geometrical* Progreſſion,

Put $s = 498{,}95$ *l.* the Sum of the Terms.
$r = 3$, the *Ratio* in Years.
$a = 3{,}15$ *l.* the 1*ſt* Term.
$n = ?$ req$^{\text{d}}$.

By *Jone*'s *Synopſis Palmariorum, p.* 201.

$$n = \frac{\text{L.}\overline{r-1} \times \overline{s+a} : -\text{L.}\,a}{\text{L.}r} = \frac{\text{L.}1004.2;\ -\ \text{L.}3{,}15}{\text{L.}3} =$$

5.24711347 *ferè.* Where L. denotes *Logarithm.*

By *Corol.* I. *p.* 200. $l = a \times r^{n-1} = 3{,}15 \times 3^{4.24711347} =$ $334{,}7333 = 334$ *l.* 14 *s.* 8 *d*: But as n is a broken N°. this Valu of l will but partly anſwer the *Conditions* of the Queſtion, which is no *reduced to,*

What is a Debt of 498 *l.* 19 *s. worth in* ready Money, *payable, above, at the End of* 5,24711347 *Years, at three Times as much at ea Year's End as was paid at the End of the former Year; allowing,* 5 *Cent Compound* Intereſt *for the Money paid down to the Time of each P ment; except* ſimple *Intereſt for the Payment at the* 1*ſt Year's End?*

No

Now, if $p =$ Principal put out, or *Sum* forborn.
$n =$ N°. of Years, or *Parts* of a Year.
$r =$ *Rate* of 1 *l.* *per* Year, $= ,05$.
$m =$ Amount of the ſaid Principal, for the Time n, at that *Rate*, r.

n, the preſent Work, $p = \frac{m}{1 + rn}$ allowing *ſimple Intereſt.*

And if $x = 1 + r = 1,05$; Then, preſent Worth, $p = \frac{m}{x^n} = \mathrm{L}.m - \mathrm{L}.x$

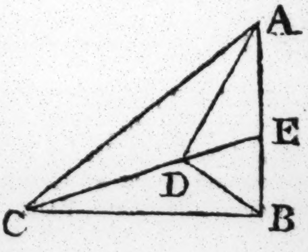
x, allowing *Compound Intereſt.* From which *Theorems* † the ſeveral preſent *Worths* deduced, as *above* *.

Mr. *Buddle* made the Time of Payment 5 Years and 1 Month, laſt Payment l. 16 *s.* nearly.

OUR Correſpondents, in *general*, miſtaking the Conditions of the Queſtion, their Anſwers wide of Truth. The *preſent Worth*, (as they ſent) being not what will amount to, at compound Intereſt, 498 *l.* 19 *s.* in the Term of Years when laſt Payment is to be made; but is the *Sum* of the *ſeveral preſent Worths* of each ective Payment, and Times of Payment. Or the *Sum* of the ſeveral Purchaſes ſo many Debts payable at certain and different Times. For, tho' the *Diſpoſer* his Debt, putting out his *ready Money* at continual or *Compound* Intereſt for Time, at which the laſt Payment is to be made, will make it amount thereby more than his Debt; yet the *Buyer* putting out his *Money* at compound Intereſt, received, it will amount thereby to an equal Value, and alters not the Value the ſeveral preſent Worths, or *Sum* of all.

XIV. QUESTION 160. *Anſwered by Mr.* Alexander Rowe.

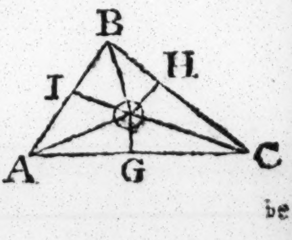
LET A, B, and C, repreſent the *three Fires*; from C, draw CE, at any ∠ with ; let D be the required *Place*. Put $a = 40 = \mathrm{CB}$; $= 50 = \mathrm{CA}$; $c =$ Coſ. ∠BCD $= 72°$; (for I take C $= 18°$) $m =$ (that of ACD $=$) 71° 8′; and $x =$. Then, $\overline{\mathrm{AD}}^2 = b^2 + x^2 - 2bmx$; and $\overline{\mathrm{DB}}^2 =$ $+ x^2 - 2acx$. The *Laws* of Light and Heat, in the *reciprocal Ratio* of the Diſtances from the s; the Magnitudes of the Fires, nor their Ratios Heat being given, they are ſuppoſed equal) Hence, $\overline{a^2 + x^2 - 2acx} + \overline{b^2 + x^2 - 2bmx}$, for Strength of Heat, at D, a *Minimum.* In Fluxions and reduced, $x = \frac{+ ca}{3} = 28,45198$; Whence, AD $= 24,843$, &c. DB $= 151.6448$ Yds.



Hence, a very uſeful *Corollary* may be drawn.

The ſame anſwered by Cheſterfieldienſis.

LET A, B, C, repreſent the 3 Fires; and ⊙ the int ſought; let fall the Perpendiculars, H⊙, I⊙, G⊙; and put $d = 50 = \mathrm{AC}$; $c = 30 = \mathrm{AB}$; $40 = \mathrm{BC}$; and $x = \mathrm{GC}$, variable, while G⊙ is ſtant, which call y. Then will $\frac{1}{x^2 + y^2} + \frac{1}{d - x^2 + y^2}$ preſs the Heat of the Fires at A and C, which are to



be a *Minimum*, at the Point $\odot$; In *Fluxions*, (when $y = 0$) $= \frac{-2x}{x^4}$

$$\frac{2d\dot{x} - 2x\dot{x}}{\overline{d-x}|^4} = 0.$$

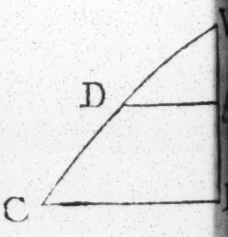
Hence, $x = \frac{d}{2}$; Conſequently $AG = GC$; and alſo by ſubſtituting *c* for *d*, is equal to IB; and ſubſtituting *g* for *d*, BH is equal to HC. But $\triangle$s $A\odot G$ $G\odot C$, having AG and $G\odot$ common, as alſo $\angle \odot GC = \odot GA$, being angled by *Conſtruction*; therefore, $\triangle A\odot G = G\odot C$, (E.4.1) Alſo, $\triangle AI\odot$ $\triangle IB\odot$; $B\odot H = H\odot C$; *conſeq.* $A\odot = B\odot = C\odot$. — Hence the Point $\odot$ the Center of a Circle paſſing thro' the 3 given *Fires*; E.9.3. But, becauſe □ of AC (= 2500) = *Sum* of the □s AB and BC (= 900 and 1600) *Queſt.* Therefore $\triangle$ ABC is right $\angle$d at B; and *conſeq.* the Point $\bigcirc$ will in the *Middle* of AC, the Diam. of the Circle; and the Diſt. required = 25 being half AC, by the Nature of the Circle; E.31.3. Q. E. I.

Scholium. The Heat at B may be expreſſed by $1 + \frac{1}{\overline{AB}^2} + \frac{1}{\overline{BC}^2}$ and the at A, by $1 + \frac{1}{\overline{AB}^2} + \frac{1}{\overline{AC}^2}$; at C, by $1 + \frac{1}{\overline{AC}^2} + \frac{1}{\overline{BC}^2}$; conſeq the *greateſt Heat* from all the Fires will be in the Fire, at B, a *Maximum.*

Mr. *Bevil* makes another Thing in his Solution of this Queſtion; but as he wrought out no Numbers to his intricate final Equation, and made no Concluſ we omit his Anſwer.

XV. QUESTION 160, *anſwered by Mr.* G. Brown *of* Portſmouth-Common.

LET VB repreſent the Height of the Ship's *Maſt*; BC perp. thereto. Then it is evident, the Ball in its *Deſcent* to the Deck, at C, will deſcribe (by the compound Force of Gravity and the Ship's forward Motion) the Curve VDC. — Put t = Time of the Ship's ſailing, while the *Ball* deſcends to the Deck: $AD = d$; $VA = b$; $VB = x$, and $BC = y$.



Then $d : t :: y : \frac{ty}{d}$ = Time of ſailing over BC.

By the Nature of falling Bodies, $t^2 : b :: \frac{t^2y^2}{d^2} : x$; $\because \frac{d^2}{b}x = y^2$: Hen the Curve VDC is the *Common Parabola* (ſuppoſing no Reſiſtance of *Medium*) wh *Vertex* is V, and Parameter $\frac{d^2}{b}$.

Put $y = 302,1$ Inches $= 1,007 \times 25 \times 12 = BC$; $x = 344.25$ Inches =

Then, by Fluxions, $\frac{\dot{y}\sqrt{\frac{1}{4}p^2 + y^2}}{\frac{1}{2}p}$ = the Fluxion of the Curve VDC; put

, and it may be transformed to $\frac{\frac{1}{2}by\dot{y}+y^3\dot{y}}{b\sqrt{b^2y^2-y^4}}+\frac{\frac{1}{2}b\dot{y}}{\sqrt{b^2+y^2}}$, whoſe *Fluent* rrected will be $\frac{\frac{1}{2}y\sqrt{b^2+y^2}}{b}+1.15129\,b\times\text{Log.}\,\frac{y+\sqrt{b^2+y^2}}{b}=$ 53,1954 Inches = 46,0996 *Feet*, the required Length of the Curve VDC, the ſtance deſcended by the *Six Pounder* from the Maſt Head of the Ship *Neptune* the Deck. Q. E. I.

Cheſterfieldienſis ſolved it by the ſame Kind of *curious* and correct Proceſs, de- rmining the No. of Inches deſcended by the Shot = 553,2

567.42 Inches computed in
Error 14.22 Diff. [L. Diary, 1730.

The Same anſwered by Mr. John Buddle.

THE Ball deſcends by a compound Force (of Gravity and the Ship's Motion forward the Curve of a common *Parabola*, whoſe Equation is $ax=yy$.

There is given the *Abſciſſa* $x=432{,}25$ Inches, deſcended by the *Force* of Gra- ty only; and its correſponding Semiordinate = 25 *Grecian* Feet = 302,1 Engliſh ches; and $a=210.1656$ the *Parameter* of the *Parabola*.

By the *Curve*'s Equation, $\dot{x}=\frac{2y\dot{y}}{a}$, whence the *Fluxion* of the Curve's Length $\sqrt{\dot{x}\dot{x}+\dot{y}\dot{y}}$ is $\frac{\dot{y}}{a}\sqrt{aa+yy}$, whoſe *Fluent* corrected by *Forms* 9 and 10 of *Emerſon*'s luxions, the Curve's Length will be $\frac{y}{a}\sqrt{\frac{1}{4}aa+yy}$; $+\frac{2{,}30258a}{4}\times$ Log. $\frac{+\sqrt{\frac{1}{4}aa+yy}}{\frac{1}{2}a}=553{\cdot}31699$ *Inches*, the Space deſcribed by the *Ball*. Q. E. I.

ANSWER *to the* PRIZE-QUESTION *in the* PALLADIUM for 1759, *by* URANIA.

THE moſt eaſy and expeditious Method of giving the Times of the *Eclipſes* and ther *Phænomena* required, is by determining them from *De la Caille*'s *Ephemerides* t *Paris*. Which uſeful Performance we are obliged to ſend for into *England*, cauſe (ſince our late famous Dr. *Halley*) the *Britiſh* aſtronomical Profeſſors are t pleaſed to afford us a *Manufacture* ſo uſeful of our own.

IV. ECLIPSES, 1760: II. of the SUN and II. of the MOON.

I. Of the MOON, *May* 29, at Night.

At	Beginning. h	m	s	Middle. h	m	s	End. h	m	s	Duration m	s	Digits eclips'd.	
Greenwich.	9	13	37	9	36	37	9	59	37	46	0	24′ of a [Dig.	On the Southern Part.
At *Gibraltar.*	8	53	45	9	16	45	9	39	45	Same.		Same.	

The Times, correſpondent to thoſe at *Greenwich*, in *Antigua*, *Jamaica*, *New England*, and *Virginia*, are 4 Hours or more ſooner; and conſequently this Eclipſe the Moon, in thoſe Places, is *inviſible*; happening to thoſe Inhabitants in the Day-Time.

At *Bengal* this Eclipſe of the Moon happens 6^h 9^m later, and at *Bombay* 4^h 52 ter, than at *Greenwich*.

II. Of the SUN, *June* 13, Morning.

	Beginning.	Middle.	End.	Digits eclipſed.
	h m	h m	h m	d ′
At *Greenwich.*	6 41	7 14	8 17	4 10
At *Gibraltar*	6 50	. .	. .	7 30

Being inviſible in *Antigua*, *Jamaica*, *New England*, and *Virginia*, where
Moon's *Penumbra* does not come.

The Moon's *Penumbra* firſt touches the Earth's Surface on the *African* Co
It paſſes over the Regions of *Europe*, great Part of *Africa* and *Aſia*; an
bounded by the *Arctic* Circle and a Line from *Guinea* to the *Philippine* Iſlan
The *central* Eclipſe, or dark Shadow, enters at Sun-riſe near *Barbary*, and trave
over the *Mediterranean*, *Perſia*, *India*, and *China*; at which laſt Coaſt at Sun-
it quits the Earth's Surface, and falls into the Expanſe.

III. Of the MOON, *November* 22, at Night.

At *Greenwich.*	Beginning.	Middle.	End.	Duration	Digits eclipſed.	
	h m s	h m s	h m s	h m		
	7 55 16	9 8 46	10 22 16	2 27	6^d 21′	On the North^n. Part.

Inviſible at the Places beforementioned, in *America*.

Viſible at *Gibraltar* 19^m 52^s ſooner; at *Bengal* 6^h 9^m, and at *Bombay* 4^h
later than at *Greenwich*.

IV. Of the SUN, *December* 7th, 2^h 8^m Afternoon.

Inviſible at *Greenwich*, or in *Europe*, but *viſible* in South *America*, where
Moon's *Penumbra* paſſes over the Earth's Surface.

January 29, *Appulſe* ☽ and H ♊; The Moon's upper Limb 4′ from ✱,
2^h 23^m, Morn. at *Greenwich*.

May 19, *Occultation* γ ♋ by the *Moon*.
Immerſion 7^h 28^m } Night at *Greenwich*.
Emerſion 8 33 } Moon's Center 4′ ſoutherly of ✱.

June 22, *Occultation* κ ♍ by the *Moon*.
Immorſion 11^h 15^m } Night, at *Greenwich*.
Emerſion 12 22 } Moon's Center 3′ northerly of ✱.

November 25, *Occultation* ε ♊ by the *Moon*.
Immerſion 6^h 2^m Morning } at *Greenwich*.
Emerſion 6 59 Morning } Moon's Center 6′ ſoutherly of ✱.

December 25, *Occultation* η ♌ by the *Moon*.
Immerſion 10^h 4^m } Night, at *Greenwich*.
Emerſion 10 37 } Moon's Center 14′ ſoutherly of ✱.

REMARK on ECLIPSES of the SUN.

THE Moon's greateſt apparent Diameter exceeds the leaſt Sun's appa
Diameter by about 2′ 4″; whence the *total Darkneſs*, in the greateſt Eclipſe of
Sun that can happen, continues while the Moon moves from the Sun, 2′
of a *Degree* in her Orbit; being about 4^m 5^s of *Time*.

The Moon's *dark Shadow* covers a Spot on the Earth's Surface about 3° 10′
190 geographical Miles broad, or 220 *Engliſh* Miles, when the Moon's appa
Diameter is *greateſt* and that of the Sun's the leaſt; and therefore the *total D*
neſs of a ſolar Eclipſe extends no further to the Earth's Inhabitants than w
the Moon's *dark Shadow* covers the *Track*. But the Moon's *partial* Shadow,
Penumbra, can, at the ſame Time, cover a *circular* Space of 70° 50′ or 4900
liſh Miles in Diameter, within which the Sun is ſeen more or leſs eclipſed,
Places more or leſs diſtant from the *Penumbra*'s Center.

W

hen a new Moon, at a *ſolar* Eclipſe, happens in the *Node*, or Place of the n croſſing the Ecliptic, the Moon's *Penumbra*, at the Middle of the *general* ſe, is circular; falling perpendicular on the Earth's Surface: But at every Time of Duration, it falls *obliquely* on the Earth's Surface; and therefore igure thereon will be *elliptical*; and more or leſs ſo, as the Time is more or leſs the Middle of the *general Eclipſe*, when the greater or leſs Surface of the is covered.

e *general Eclipſe* begins when the Moon's *Penumbra* firſt touches the Earth's ce, and ends when it quits the Surface. And from the Beginning to the End e Moon's *Penumbra* travelling over the Earth's Surface, the Sun appears ed to ſome of thoſe *Parts* which it travels over.

particular Eclipſe of the Sun begins when the Moon's *Penumbra* firſt touches Place, and continues till the *Penumbra* quits it.

hen the *new Moon* happens in the *Ecliptic*, or *Node*, the Moon's *Penumbra* over the Center of the Earth's Diſk, as ſeen at the Moon; and, by deſ- g the *longeſt Track* poſſible upon the Earth, continues the *longeſt*, or at the Rate of 5 *Hours* and 50 *Minutes*; but *more*; if the Moon is at her greateſt nce, then moving *ſloweſt*; or *leſs*, if ſhe is at the leaſt Diſtance, then moving ſt. – The Limits of a ſolar Eclipſe are when the Moon is about 16° 36′ from ode, at new Moon; when the *Borders* of Sun and Moon are ſeen to *touch*: If Moon is leſs diſtant than 16° 36′ from her ☊, an Eclipſe greater or leſs muſt n; otherwiſe not.

e Motion of the *Shadow* from *Weſt* to *Eaſt*, on the Earth's Surface, is equal e Motion of the *Moon* from the *Sun*; being at a mean Rate, ½ Degree every .

d ½ *Degree* in the Moon's Orb is equal to 30 Degrees of the Earth's great Circle, herefore the *Moon's Shadow* travels 30 *Degrees*, or 1800 *geographical* Miles he Earth's Surface in an Hour, or 30 Miles in a Minute; being about four s as ſwift as a Cannon Ball flies.

Of LUNAR ECLIPSES.

e Moon is ſometimes ſeen totally eclipſed in the Horizon, when the Sun has viſible at the ſame Time, in the oppoſite Part thereof, by *Refraction*. The t Duration of a total and central lunar Eclipſe is about 3^h 57^m at her greateſt nce from the Earth, and 3^h 37^m at her leaſt Diſtance.

Rad. : *Sine* ☽'s *Lat.* :: *Sine* ∠ ☽'s *Way with Circle Lat.* : *Sine neareſt* ce of the *Moon's Shadow and her Center.*

m Sum ☉ and ☽'s horizontal Parallax ſubtract the apparent Semi-Diameter he Remainder = apparent Semi-Diameter of the *Earth's Shadow*; which muſt creaſed by about 50″ for the Earth's Atmoſphere.

the Semi-Diameter of the *Earth's Shadow* thus encreaſed add the apparent Diameter ☽, and if the *Sum* be greater than the *neareſt Diſtance* of their Cen- before found) the Moon muſt be eclipſed at that Time, otherwiſe not. —

found eclipſed, from the Sum of the Semi-Diameters of the Moon and 's Shadow, ſubtract the neareſt Approach of their Centers, and the *Re-* r will be the deficient Part.

, As Semi-Diam. ☽ : 6 Digits or 360′ :: Part deficient : Digits eclipſed e Moon. — The Moon's *Eclipſe-Limits* are about 12° 5′, her Diſtance from ode, at full Moon; if leſs, ſhe muſt be partly or wholly involved in the Earth's w and *Penumbra*.

The USE of a terreſtrial GLOBE in ſhewing ECLIPSES of the SUN MOON.

FIND the *Place* on a Globe to which the Sun is *vertical* in the Middle of or *lunar* Eclipſe, which being elevated to the Latitude of that Place, then i of the Places above the Horizon the *Sun* will be ſeen eclipſed. And in all below the Horizon, the Moon will be ſeen to paſs through the *Earth's* S in her Eclipſe.

URANIA claims the *Prize-Palladiums* without a Competitor.

ANSWERS *to the* PARADOXES *in the* PALLADIUM *for* 1759.

I. PARADOX *anſwered by* NUMERICUS.

THUS nine *like Figures** plac'd to *View*,
The *greateſt Quantity* will ſhew.
If, otherwiſe, the *leaſt* you chuſe,
Inſtead of that, this *Method* † uſe.

$*9^{99999999}$ *Power.* $\dagger\ \frac{9}{99}\big|999999$ *Power.*

☞ The *Maximum* and *Minimum* are beſt diſcovered by determining the and leaſt Logarithms to both Quantities.

II. PARADOX *anſwered by* Mr. Huntley.

SIX Figures thus diſpos'd ‖ expreſs
Ten Thouſand — neither more nor leſs.

‖ $9999\frac{9}{9}$

Mr. *Robert Abbey* of *Watford, Northamptonſhire*, anſwered it in the ſame M ſo did Mr. *Hammond*, the Propoſer; Mr. *George Stapley*, &c.

An Anſwer to the VOTER'*s* QUESTION. *By Mr.* Stapley.

LET A and B repreſent the two firſt Candidates, and C the third, who Votes; then $52 - 34 = 18$, the Number of Votes that A and B have each voting. Again $18 + \frac{34}{2} = 35 =$ A's Number of Votes. Alſo $18 + \frac{34}{2} =$ B's Number of Votes; therefore C muſt loſe his *Election*.

Mr. *Ch. Maſon* ſends us an Anſwer to the 8th *Quere* in *Palladium* 1758, lows, but came too late laſt Year to be inſerted.

THE Velocity of Tides gradually decreaſe, as the Diſtance increaſes fr Ocean; and *Obſtacles* alſo are to be conſidered, and the Quantity of Wat Square of the Depth.

Suppoſe $a = 120$ Feet, $e = 13$, and $u = 40$: Then $a : e^2 :: u :$ $=$,5055, &c. Again, as 11 ($\frac{1}{2}$ of Miles) : 13 Depth :: 1 : 1,1818, &c added to the former gives the Height it will flow in the ſame Time and about $8\frac{2}{3}$ Feet.

Mr. *George Stapley* anſwered the ſame in the ſame Manner.

A TRUE CHARACTER. By the AUTHOR.

rs. **ELIZABETH BEIGHTON,** *(Relict* of the late Mr. HENRY BEIGHTON, .S.) at *Chelvers-Coton,* near Sir ROGER NEWDIGATE's, *Bart.* of *Arbury,* ickſhire, DIED, on *Friday,* the 12th of *October,* 1759: Much *regretted,* by who had the Satisfaction to know her, for her many *excellent* and *admired* ities.

e was a public *Example* of diſintereſted *Friendſhip* and *Benevolence!* And her ty and *good Offices,* to the utmoſt of her Abilities, were exceeded by none.

ſhe delighted in the Promotion of *human Happineſs,* ſhe was a profeſſed Ene- o *Vice* and *Folly* in any Shape. And choſe her Acquaintance rather among *nocent* than the GREAT.

e was a great Encourager of *virtuous* Principles and Actions.

e admoniſhed the *Vicious* in the *Socratic* Way, and by laying the *Diſadvantages* ice before them in *general* Characters.

e encouraged the *Virtuous,* by ſhewing them the noble Characters of the *Wiſe,* , and *Happy* Men, in all Ages!

e was *eminent* for her exemplary *Conduct, Prudence, Piety,* and *Morals!* And *idelity* was *ſacred* and *inviolable!*

e poſſeſſed the Talent of *ſprightly Wit* in an eminent Degree; which never to diſcover itſelf in her utmoſt *Afflictions, Diſtreſſes,* or *Miſfortunes,* wherein *titude* of Mind was always remarkable. And, till the laſt alarming Circum- of her threatening *Diſorder,* (for 3 or 4 Years paſt) when her *Pain* was imes *intolerable,* the *Gaity* of her FANCY was never known to flag.

as by her *ſprightly* Talents and ſolid *Judgment,* that the LADIES DIARY hich ſhe was *Proprietor)* once flouriſhed with *unrivaled* Reputation! When, he Aſſiſtance of her *Friends,* that *annual Work* was cultivated the *moſt* for Utility, and the Advantage of that SOCIETY, enjoying the *Fruits* thereof; ontinued her (as *Proprietor)* in the Right of her *Copy-Money,* ſince the *Diary* formed by others.

was *Miſtreſs* of an excellent *Memory* and *Underſtanding*; and knew the of *Books,* as well as of *Company*; from whence, by her *ſelect* Reading and ſation, ſhe derived *private* and *public* Advantages; to which her *ingenious,* and *florid* Pen, did not a little contribute. *Two large Manuſcript Volumes* iterary *Correſpondence, (treaſured by the Author of the* Palladium) *are everlaſting* nts *of her* Merit *and* Virtue!

was a *conſtant* and *affectionate* Wife, a *kind* and *inſtructive* Parent, a *choice* and iend, and a NOBLE PATTERN OF HER SEX.

ny of the *Virtuous* upon Earth are bleſſed with a Perfection of Joy in a Life hereafter, her *Title* to *eternal* Happineſs is certainly the moſt *undoubted.* o, now, in the *Preſence* of the SUPREME BEING, attended with the *An-* d *Seraphic Hoſts* of Heaven, is poſſeſſed of BEATITUDE, paſt Utterance, ERMORE!

ARKS *on the* late METHOD *of* OBSERVING *the* ECLIPSES of JU- TER's SATELLITES, *and* LONGITUDE at Sea, *by Mr.* IRWIN.

have ſeen it publiſhed in the *Papers,* that Mr. *Irwin,* from *Ireland,* pre- o have diſcovered the *Longitude* at *Sea,* to about 15 Miles or leſs, by obſerving es of the Eclipſes of *Jupiter*'s Satellites: The Right Honourable Lord having atteſted that the Obſervations of theſe Eclipſes may be made within

3 Minutes of Time, which at 360° to 24 Hours, or 15 Miles to a
of Time, make 45 Miles, according to Lord *Howe*; inſtead of 15 Miles,
ing to Mr. *Irwin*. And as moſt of the *Theories* of theſe *Satellites* differ fo
about 3 or 4 Minutes, in the Time of theſe *Eclipſes* happening, at a firſt M
by Computation, therefore when the Error of 4 Minutes, by Computation,
ſame Way with the Error of 3 Minutes of Time by Obſervation of thoſe
under a diſtant Meridian, the *whole Error* of Time will be 7 *Minutes*.
Times 15 make 105 Miles or 1° and ¾ Error of Longitude, by *Irwin*'s M
a Quantity ſufficient to loſe a Ship; and therefore till the *Satellite-Theory*
fected, this Method of obſerving the Longitude at Sea, by Mr. *Irwin*, ca
depended on for Truth. But to render it as uſeful as poſſible, we have inſe
Times of the *Eclipſes of Jupiter*'s firſt Satellite at *Greenwich*, in a following
from a new *Satellite-Theory* agreeing with Obſervation, the neareſt of a
known. Mr. *Irwin*'s Diſcovery is the Method of obſerving the Eclipſes of J
Satellite in a Chair, ſuſpended perpendicularly, in a Ship, at Sea; and is
Diſcovery of the *Longitude itſelf* by that Obſervation.

Of OBSERVING the LONGITUDE at Sea, by the MOON's THE

THE Moon's Theory being *more perfected* than that of the Satellites of
if you take the Altitudes and Poſition of the Moon and ſome *fixed Star*,
each other, and the Time of Obſervation, determining from thence the
true from her apparent Place, under any diſtant Meridian, and find the *exa*
from Tables conſtructed from a correct lunar Theory, when the Moon's tru
at *Greenwich*, is the ſame with that obſerved under a diſtant Meridian; th
rence of which Times turned into Degrees, allowing 15 Miles to a Minute o
will be the *Difference* of Longitude between *Greenwich* and the *Place of Obſ*
This Method we have exemplified in our *Aſtronomia Accurata*, or *Royal A*
and Navigator. — For 13° 10′ 15″ ☽'s M. Mot. in 24 Hours, allow on
Part of it, or 2′ 11″, for every Deg. of Longitude being ☽'s Increaſe of P
every 4 Minutes of Time. Hence, if the Moon's Theory errs 1 Minute o
it will give the Longitude of the Place of Obſervation within ½ Deg. of
which is of great Uſe in *long Voyages*, and may give it nearer ſometimes. B
errs 2′ 11″, the whole Dif. of ☽'s Place in 4 Minutes of Time, the Error
obſerved, will be but 1 Degree, at any Time, which is leſs than 1¾ Deg.
happen by *Jupiter's Satellite Theory*; except by the Times of thoſe Eclipſes
laſt Improvement of it; we have given P. 73. to be depended on (where a
vation of the Time of an Eclipſe of 1ſt Satellite can be truly made) the mo
Method of obſerving the Longitude hitherto known. — The 360 Part of
Dif. of Time in ☽'s Southing in 24 Hours affords not above 9 Seconds of
1 Deg. Dif. Long. — But the 360 Part of 24 Hours Dif. Time of an Eclip
piter's 1ſt Sat. affords 4 Minutes Dif. *in Time to 1 Deg. Dif. of Long.*
Therefore, *happy* for Navigators, *when the Satellite* Theory *and Method of*
the exact Time of the Satellite Eclipſes *are perfectly diſcovered!* — But our
cal Obſervators (contrary to the Cuſtom of other Nations) deny us their
tions for improving into *uſeful Theories* for the public Utility, though they
with the public Money. — And we never could have obtained the radical m
and *Motions* of the Moon (denied us by Mr. *Gael Morris*, and others) but b
Mr. *Muckworm*, an Exchange-Broker, who helped us to our Wants: W
other Journey-Men Star-gazers, timely ſaved the Scaling and Storming o
ſervatory, by their Friendſhip!

TABLE for ſhewing the Difference of LONGITUDE from GREENWICH, by OBSERVATION.

Correct Times of the ECLIPSES of the firſt SATELLITE of JUPITER, for 1760, N. S. at *Greenwich* Obſervatory.

January.		February.				March.				April.				May.				June.		
		Immer.				Immer.				Immer.				Immer.				Immer.		
	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s
	14	15	13	27	1	13	32	12	2	10	12	56	2	12	22	5	1	14*	23	29
	16	9	44	5	3	8	1	3	4	4	41	51	4	6	50	39	3	8	51	34
	18	4	10	46	5	2	29	55	5	23	10	45	6	1	19	11	5	3	19	39
Jupiter be- g in Con- ction with e Sun, in is Month, e *Eclipſes* his 1ſt Sa- lite are in- ſible till Fe- ary 14.	19	22	39	28	6	20	58	48	7	17	39	39	7	19	47	40	6	21	47	44
	21	17	8	12	8	15	27	42	9	12	8	33	9	14*	16	7	8	16	15	48
	23	11	36	58	10	9	56	37	11	6	7	26	11	8	44	33	10	10	43	51
	25	6	5	45	12	4	25	43	13	1	6	18	13	3	12	57	12	5	11	53
	27	0	34	33	13	22	54	29	14	19	35	10	14	21	41	40	13	23	39	54
	28	19*	3	22	15	17*	23	26	16	14	4	1	16	16*	9	42	15	18	7	55
					17	11	52	23	18	8	32	49	18	10	38	2	17	12*	35	56
		Computed by a *New Theory* agreeing with Obſervation. For the Uſe of the *Navigator.*			19	6	21	20	20	3	1	33	20	5	6	21	19	7	3	59
					21	0	50	17	21	21	30	15	21	23	34	38	21	1	32	1
					22	19	19	14	23	15*	58	56	23	18	2	51	22	20	0	4
					24	13	48	12	25	10	27	36	25	12	31	1	24	14*	28	8
					26	8	17	9	27	4	56	15	27	6	59	10	26	8	56	12
					28	2	46	7	28	23	24	53	29	1	27	17	28	3	24	17
					29	21	15	4	30	17	53	30	30	19	55	23	29	21	52	22
					31	15	44	0												

☞ Theſe Times to be compared with thoſe obſerved in Mr. *Irwin*'s Chair, at Sea!

July.				Auguſt.				September				October.				November				December		
Immer.				Immer.				Emerſions				Emerſions				Emerſions				Emerſions		
h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s
16	20	28	2	12	51	34	1	17	20	34	1	19	39	38	2	16	25	28	1	0	2	46
10*	48	36	4	7	20	16	3	11*	49	49	3	14	9	2	4	10	54	25	2	18	31	2
5	16	46	6	1	49	2	5	6*	19	5	5	8*	38	23	6	5*	23	17	4	12	59	15
23	44	58	7	20	17	52	7	0	48	22	7	3	7	43	7	23	52	5	6	7*	27	27
18	13	11	9	14*	46	47	8	19	17	40	8	21	37	2	9	18	20	50	8	1	55	37
12*	41	26	11	9*	15	42	10	13*	46	59	10	16	6	20	11	12	49	31	9	20	23	46
7	9	43	13	3	44	37	12	8*	16	19	12	10*	35	38	13	7*	18	9	11	14	51	54
1	38	1		Emerſions			14	2	45	39	14	5	4	56	15	1	46	45	13	9	20	1
20	6	21	15	0	29	35	15	21	14	59	15	23	34	13	16	20	15	19	15	4*	48	7
14*	34	44	16	18	57	42	17	15	44	20	17	18	3	29	18	14	43	51	16	22	16	12
9	3	9	18	13*	27	30	19	10*	13	42	19	12	32	44	20	9	12	22	18	16	44	17
3	31	36	20	7*	56	31	21	4	43	4	21	7*	1	57	22	3	40	51	20	11	12	22
22	0	5	22	2	25	35	22	23	12	26	23	1	31	7	23	22	9	19	22	5*	40	27
16	28	36	23	20	54	41	24	17	41	50	24	20	0	14	25	16	37	44	24	0	8	32
10*	57	9	25	15*	23	49	26	12*	11	16	26	14	29	19	27	11	6	7	25	18	36	37
5	25	43	27	9*	52	48	28	6*	40	43	28	8*	58	23	29	5*	34	28	27	13	4	43
23	53	18	29	4	22	9	30	1	10	11	30	3	27	26					29	7*	32	49
18	22	55	30	22	51	21					31	21	56	28					31	4	0	56

N, B. The *Aſteriſm* (*) is placed againſt thoſe Eclipſes of the 1ſt Satellite of *Ju-*
r. viſible at *Greenwich* Obſervatory

Royal EPHEMERIS, for *Greenwich Observatory*, 1760.

D.	January.		February.		March.		April.		May.		Ju
	☽ South	Decl. Noon.	☽ South	Decl. at N.	☽ South	Decl. Noon	☽ South	Decl. Noon.	☽ South	Decl. Noon.	☽ South
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m
1	11 17	23N 4	12 40	20N 0	12 11	13n26	13 7	4S54	13 22	16S 4	14 40
2	12 18	24 11	13 28	16 21	12 56	8 43	13 49	9 44	14 9	20 28	15 33
3	13 17	23 41	14 14	11 52	13 39	3 45	14 33	14 7	14 58	23 0	16 24
4	14 11	21 49	14 58	7 5	14 21	1S20	15 19	17 59	15 49	24 32	17 14
5	15 3	18 43	15 41	2 8	15 4	6 17	16 9	21 6	16 42	24 58	18 2
6	15 51	14 45	16 22	2S54	15 47	10 57	16 59	23 21	17 33	24 13	18 49
7	16 35	10 15	17 6	7 41	16 31	15 8	17 51	24 36	18 25	22 9	19 36
8	17 16	5 26	17 50	12 12	17 17	18 48	18 43	24 41	19 15	19 1	20 23
9	17 57	0 29	18 36	16 13	18 6	21 40	19 35	23 30	20 4	14 47	21 14
10	18 37	4S24	19 24	19 38	18 57	23 36	20 27	21 5	20 52	9 47	22 8
11	19 19	9 6	20 15	22 14	19 51	24 31	21 19	17 31	21 42	3 38	23
12	20 1	13 19	21 6	23 52	20 45	24 11	22 11	12 52	22 34	2N 4	☌
13	20 47	17 19	21 59	24 20	21 40	22 32	23 3	7 23	23 30	8 15	0 11
14	21 36	20 30	22 54	23 30	22 33	19 36	23 56	1 23	☌	14 2	1 13
15	22 29	22 50	23 49	21 23	23 26	15 31	☌	4N54	0 29	18 58	2 15
16	23 23	24 4	☌	17 58	☌	10 31	0 52	10 57	1 33	22 35	3 14
17	☌	24 7	0 41	13 31	0 17	4 44	1 48	16 20	2 38	24 38	4 8
18	0 18	22 50	1 32	8 14	1 9	1N14	2 46	20 39	3 43	24 56	4 57
19	1 11	20 17	2 23	2 30	2 2	7 29	3 47	23 33	4 44	23 34	5 42
20	2 3	16 35	3 13	3N27	2 56	11 4	4 47	24 49	5 40	20 53	6 24
21	2 52	12 2	4 4	9 13	3 52	17 58	5 48	24 30	6 29	17 12	7 6
22	3 42	6 41	4 56	14 26	4 52	21 38	6 44	22 44	7 13	12 46	7 46
23	4 31	1 1	5 52	18 50	5 51	23 54	7 36	19 49	7 55	7 55	8 28
24	5 21	4N45	6 48	22 8	6 50	24 40	8 24	15 36	8 35	2 53	9 11
25	6 9	10 19	7 45	23 58	7 46	23 58	9 7	11 27	9 14	2S16	9 56
26	7 2	15 18	8 43	24 25	8 38	21 55	9 50	6 34	9 54	7 14	10 43
27	7 57	19 30	9 40	23 24	9 28	18 45	10 30	1 32	10 35	11 54	11 34
28	8 56	22 26	10 34	21 3	10 15	14 25	11 12	3S34	11 20	16 6	12 25
9	9 55	24 4	11 24	17 38	11 0	10 8	11 54	8 29	12 7	19 43	13 18
30	10 53	24 7			11 44	5 13	12 38	13 2	12 56	22 32	14 8
31	11 48	22 45			12 26	0 8			13 48	24 20	

☽ S.Diam. to horPar. as 15′ to 55′ 30″.

D.	☽ S.D in Deg	In T.	D.	☽ S.D	T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg
	′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″
1	16 4	61	1	15 41	69	1	15 21	66	1	14 53	62	1	14 48	64	1	14 57
3	15 49	72	3	15 20	65	3	15 21	62	3	14 47	63	3	14 49	67	3	15 10
12	14 49	65	5	15 2	62	5	14 51	62	5	14 47	66	5	14 5	69	5	15 28
14	14 47	67	7	14 50	62	7	14 46	63	7	14 57	68	7	15 16	68	7	15 48
16	14 53	69	9	14 47	64	9	14 51	66	9	15 13	69	9	15 42	67	9	16 20
18	15 12	68	11	15 1	67	11	15 7	69	11	15 47	69	18	16 16	75	17	15 47
20	15 40	67	13	15 20	70	20	16 25	70	19	16 20	74	20	15 44	70	19	15 17
2	16 12	67	20	16 14	67	22	16 9	73	21	15 54	73	22	15 15	65	21	14 55
4	16 32	70	22	16 9	70	24	15 48	72	23	15 27	68	24	14 58	62	23	14 47
26	16 35	74	24	15 58	72	26	15 31	69	25	15 4	63	26	14 50	62	25	14 46
28	16 20	75	26	15 51	73	28	15 15	65	27	14 56	62	28	14 48	64	27	14 53
										14 48	62	30	14 53		29	15 5

Royal EPHEMERIS for *Greenwich-Observatory*, 1760.

July. ☽ South	July. Decl. Noon	August. ☽ South	August. Decl. Noon	September. ☽ South	September. Decl. Noon.	October. ☽ South	October. Decl. Noon.	November. ☽ South	November. Decl. Noon.	December. ☽ South	December. Decl. Noon
h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′
14 59	20S45	16 8	2S55	17 36	17n57	18 38	25n26	20 10	17n20	20 17	3N34
15 47	17 6	16 56	2N56	18 34	[illegible] 43	19 33	25 10	20 55	12 37	20 59	1S58
16 33	12 32	17 47	8 40	19 34	24 19	20 26	23 23	21 40	7 27	21 41	7 13
17 21	7 28	18 41	14 7	20 35	25 18	21 17	20 19	22 22	2 10	22 25	12 8
18 8	1 45	19 36	18 45	21 31	24 40	22 5	16 48	23 7	3S21	23 10	16 33
18 55	4N7	20 34	22 14	22 25	22 31	22 53	11 16	23 50	8 28	23 58	20 17
19 4	9 54	21 34	24 32	23 14	19 4	23 38	6 1	☌	13 19	☌	23 11
20 4	15 13	22 32	25 6	☌	14 40	☌	0 40	0 34	17 34	0 47	25 4
21 38	19 46	23 31	24 1	0 2	9 38	0 21	4S38	1 19	21 7	1 36	25 48
22 4	23 5	☌	21 25	0 49	4 18	1 4	9 55	2 7	23 45	2 25	25 22
23 40	24 50	0 26	17 36	1 34	1S 4	1 49	14 34	2 56	25 19	3 13	23 44
☌	24 50	1 18	12 56	2 20	6 26	2 36	18 38	3 47	25 47	4 3	20 58
0 48	23 9	2 7	8 47	3 4	11 23	3 22	21 52	4 37	25 2	4 51	17 16
1 45	20 1	2 52	2 25	3 48	15 48	4 10	24 13	5 26	23 6	5 36	12 44
2 42	15 52	3 35	2S56	4 34	19 36	5 1	25 36	6 14	20 3	6 21	7 29
3 30	11 4	4 17	8 2	5 21	22 31	5 52	25 33	7 2	15 54	7 5	1 52
4 1	5 54	5 0	12 47	6 11	24 30	6 43	24 26	7 49	11 12	7 53	4N11
4 58	0 37	5 45	16 57	7 2	25 24	7 34	22 17	8 36	5 39	8 43	10 6
5 40	4N32	6 31	20 26	7 54	25 5	8 24	18 41	9 26	0N20	9 37	15 40
6 21	9 23	7 19	23 4	8 46	23 31	9 13	14 8	10 17	6 32	10 35	20 23
7 4	13 50	8 10	24 42	9 38	20 42	10 2	8 58	11 12	12 30	11 38	23 53
7 49	17 50	9 2	25 12	10 28	16 46	10 51	3 11	12 10	17 55	12 42	25 37
8 36	21 12	9 55	24 28	11 17	12 4	11 41	3N 6	13 8	22 12	13 48	25 27
9 25	23 33	10 48	22 28	12 6	6 29	12 34	9 18	14 13	24 54	14 48	23 28
10 16	24 51	11 39	19 14	12 55	0 30	13 31	15 3	15 16	25 48	15 42	19 58
11 8	25 0	12 30	15 12	13 49	5N43	14 31	19 56	16 16	24 50	16 33	15 28
12 0	23 51	13 19	9 59	14 43	11 38	15 33	23 28	17 12	22 19	17 18	10 21
12 52	21 30	14 9	4 20	15 40	16 54	16 37	25 23	18 4	18 33	18 1	5 3
13 42	18 3	14 58	1N31	15 39	21 8	17 37	25 37	18 51	13 56	18 44	0S37
14 32	13 37	15 48	7 28	17 39	24 5	18 33	24 8	19 35	8 48	19 27	5 57
15 21	8 29	16 41	13 3			19 24	21 14			20 10	11 0

D.	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S D in Deg	In T.	D	☽ S.D in Deg	In T.	D.	☽ S.D in Deg	In T.	D.	☽ S.D In Deg	In Time.
	′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″	s		′ ″	s
1	15 17	68	1	15 49	66	1	16 7	71	1	16 4	74	1	15 34	67	1	15 12	63
3	15 32	66	3	15 59	67	3	16 5	74	3	15 49	72	3	15 23	64	3	14 58	62
5	15 50	66	5	16 9	71	5	15 59	73	12	14 49	65	11	14 48	68	12	15 0	67
7	16 9	68	7	16 14	74	13	14 58	63	14	14 47	67	13	14 52	68	14	15 15	65
6	15 3[illegible]	65	16	15 0	60	15	14 48	65	16	14 53	69	15	15 8	67	16	15 46	65
8	15 8	62	18	14 48	64	17	14 50	68	18	15 12	68	17	15 36	66	18	16 15	69
0	14 51	62	20	14 50	67	19	15 3	69	20	15 40	67	19	16 7	67	20	16 40	74
2	14 46	64	22	15 2	69	21	15 26	69	22	16 12	67	21	16 37	71	22	16 44	77
4	14 51	67	24	15 22	69	23	15 33	67	24	16 32	70	23	16 45	76	24	16 27	74
6	15 9	70	26	15 42	67	25	16 13	67	26	16 35	74	25	16 32	76	26	15 55	68
8	15 22	69	28	16 0	66	27	16 23	70	28	16 20	75	27	16 5	72	28	15 24	64
0	15 36	67	30	16 6	67	29	16 17	73	30	15 45	72	29	15 36	67	30	15 4	6

Royal EPHEMERIS, for GREENWICH-OBSERVATORY, 1760.

D.	♄ South	♄ Dec	♃ South	♃ Dec.	♂ South	♂ Dec.	♀ South	♀ Dec.	☿ South	☿ D
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	°
	JANUARY.									
1	4 8	9S 3	1 20	20S50	16 51	5N16	20 44	15S20	0 24	20
4	3 56	8 57	1 10	20 41	16 40	5 0	20 42	16 1	☌	19
7	3 44	8 51	1 0	20 32	16 29	4 45	20 41	16 41	23 16	19
10	3 32	8 44	0 50	20 22	16 18	4 35	20 40	17 20	22 51	20
13	3 20	8 38	0 40	20 13	16 7	4 27	20 40	17 58	22 36	20
16	3 8	8 32	0 30	20 4	15 56	4 19	20 40	18 35	22 26	20
19	2 57	8 25	0 20	19 54	15 44	4 14	20 41	19 10	22 19	21
22	2 45	8 18	0 11	19 44	15 32	4 12	20 42	19 38	22 15	21
25	2 34	8 11	0 1	19 34	15 20	4 14	20 43	20 3	22 14	21
28	2 23	8 3	23 48	19 23	15 8	4 17	20 44	20 26	22 15	22
D.	FEBRUARY.									
1	2 7	7S52	23 35	19S10	14 52	4N22	20 49	20S50	22 20	22
4	1 56	7 44	23 25	19 0	14 40	4 34	20 51	21 4	22 24	22
7	1 45	7 36	23 16	18 49	14 27	4 47	20 53	21 14	22 29	21
10	1 34	7 28	23 7	18 38	14 15	4 58	20 56	21 14	22 36	21
13	1 24	7 20	22 58	18 28	14 2	5 12	20 59	21 12	22 43	20
16	1 14	7 12	22 49	18 17	13 48	5 30	21 2	21 5	22 50	19
19	1 4	7 3	22 41	18 6	13 34	5 51	21 6	20 54	22 57	18
22	0 54	6 55	22 32	17 55	13 19	6 14	21 9	20 36	23 5	17
25	0 44	6 46	22 23	17 45	13 5	6 38	21 13	20 12	23 13	15
28	0 34	6 37	22 15	17 34	12 50	7 3	21 17	19 43	23 22	14
D.	MARCH.									
1	0 27	6S31	22 10	17S27	12 39	7N20	21 18	19S24	23 28	13
4	0 17	6 23	22 1	17 16	12 24	7 47	21 21	18 49	23 37	10
7	0 7	6 14	21 53	17 4	12 8	8 12	21 25	18 5	23 46	8
10	23 54	6 6	21 44	16 52	11 53	8 35	21 29	17 20	23 56	6
13	23 44	5 57	21 36	16 41	11 37	8 59	21 32	16 31	0 3	3
16	23 34	5 48	21 28	16 30	11 22	9 24	21 36	15 37	0 14	1
19	23 24	5 40	21 20	16 19	11 8	9 46	21 39	14 40	0 24	1
22	23 13	5 31	21 12	16 9	10 53	10 4	21 43	13 37	0 34	4
25	23 3	5 23	21 4	15 58	10 29	10 20	21 47	12 32	0 43	7
28	22 52	5 15	20 55	15 48	10 24	10 34	21 51	11 22	0 53	10
D.	APRIL.									
1	22 44	5S 4	20 42	15S34	10 5	10N46	21 53	9S47	1 4	13N
4	22 35	4 56	20 33	15 24	9 51	10 56	21 55	8 31	1 7	15
7	22 26	4 48	20 24	15 14	9 38	10 59	21 59	7 16	1 10	16
10	22 16	4 40	20 15	15 5	9 25	10 57	22 1	5 59	1 8	17
13	22 6	4 32	20 6	14 56	9 13	10 55	22 4	4 38	1 2	18
16	21 56	4 24	19 57	14 47	9 1	10 52	21 6	3 15	0 53	18
19	21 46	4 17	19 48	14 38	8 50	10 46	22 8	1 52	0 42	17
22	21 36	4 10	19 38	14 30	8 39	10 37	22 10	0 29	0 27	16
25	21 26	4 3	19 29	14 22	8 28	10 27	22 12	0N56	0 10	15
28	21 15	3 56	19 19	14 14	8 18	10 12	22 14	2 30	23 46	14

☞ The Declinations are for the Noon of each Day.

Royal EPHEMERIS for GREENWICH-OBSERVATORY, 1760.

MAY.

	♄		♃		♂		♀		☿	
D.	South	Dec.	South	Dec.	South	Dec.	South	Dec.	South	Dec.
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	° ′
1	21 5	3 S 49	19 9	14 S 7	8 9	9 N 58	22 16	3 N 44	23 29	12 N 48
4	20 55	3 43	18 59	14 0	7 59	9 40	22 18	5 7	23 13	11 31
7	20 45	3 37	18 49	13 53	7 50	9 20	22 19	6 30	22 59	10 30
10	20 34	3 31	18 39	13 46	7 40	8 59	22 21	7 51	22 48	9 49
13	20 24	3 26	18 28	13 40	7 31	8 36	22 23	9 11	22 39	9 28
16	20 13	3 21	18 18	13 35	7 22	8 12	22 25	10 31	22 23	9 27
19	20 2	3 16	18 7	13 31	7 13	7 47	22 27	11 49	22 28	9 51
22	19 51	3 11	17 56	13 27	7 5	7 19	22 30	13 3	22 25	10 31
25	11 39	3 6	17 46	13 24	6 56	6 51	22 32	14 13	22 24	11 30
28	19 28	3 2	17 35	13 22	6 48	6 21	22 34	15 40	22 24	12 38
D.	JUNE.									
1	19 12	2 S 57	17 17	13 S 19	6 37	5 42	22 39	16 N 50	22 25	14 N 25
4	19 1	2 53	17 6	13 17	6 29	5 10	22 41	17 50	22 31	15 57
7	18 49	2 50	16 53	13 16	6 21	4 38	22 43	18 46	22 38	17 35
10	18 37	2 47	16 41	13 14	6 13	4 4	22 46	19 41	22 46	18 56
13	18 25	2 45	16 28	13 14	6 5	3 27	22 48	20 27	22 57	20 37
16	18 13	2 43	16 16	13 15	5 58	2 50	22 51	21 10	23 11	22 0
19	18 1	2 41	16 3	13 16	5 50	2 11	22 54	21 47	23 27	23 13
22	17 49	2 40	15 51	13 18	5 43	1 35	22 57	22 19	23 45	24 5
25	17 37	2 39	15 38	13 21	5 36	0 56	23 0	22 45	☌	24 34
28	17 25	2 38	15 26	13 24	5 29	0 19	23 3	23 7	0 14	24 36
D.	JULY.									
1	17 12	2 S 37	15 13	13 S 27	5 22	0 S 22	23 7	23 N 20	0 26	24 N 12
4	17 0	2 37	15 0	13 31	5 15	1 2	23 10	23 29	0 41	23 18
7	16 48	2 38	14 47	13 36	5 8	1 43	23 14	23 32	0 55	22 26
10	16 35	2 38	14 33	13 41	5 2	2 24	23 18	23 28	1 7	21 7
13	16 23	2 39	14 20	13 47	4 55	3 6	23 21	23 17	1 16	19 35
16	16 10	2 41	14 7	13 53	4 49	3 50	23 26	23 0	1 24	17 54
19	15 58	2 43	13 54	13 59	4 43	4 34	23 30	22 37	1 31	16 9
22	15 46	2 45	13 41	14 5	4 37	5 17	23 34	22 8	1 36	14 14
25	15 34	2 47	13 28	14 12	4 32	6 0	23 38	21 33	1 40	12 27
28	15 22	2 50	13 15	14 40	4 26	6 43	23 42	20 54	1 43	10 37
D.	AUGUST.									
1	15 6	2 S 54	12 57	14 S 31	4 20	7 S 39	23 47	19 N 51	1 45	8 N 15
4	14 54	2 57	12 44	14 39	4 15	8 22	23 50	18 59	1 45	6 34
7	14 42	3 1	12 32	14 47	4 10	9 5	23 54	18 4	1 43	5 0
10	14 30	3 5	12 20	14 55	4 6	9 48	23 58	17 1	1 38	3 34
13	14 18	3 9	12 6	15 3	4 2	10 33	☌	15 54	1 32	2 24
16	14 7	3 14	11 53	15 11	3 58	11 17	0 3	14 44	1 26	1 31
19	13 55	3 19	11 40	15 19	3 54	12 1	0 7	13 28	1 17	0 57
22	13 43	3 23	11 28	15 27	3 50	12 44	0 10	12 13	1 2	0 48
25	13 31	3 28	11 16	15 35	3 46	13 25	0 13	10 52	0 47	1 11
28	13 19	3 33	11 4	15 42	3 43	14 6	0 16	9 29	0 27	2 9

The Petition of *Leſs* againſt *Leſſer* and *Leaſt*, and Mr. *Short* to us, in our next.

Royal EPHEMERIS for GREENWICH-OBSERVATORY, 1760.

SEPTEMBER.

	♄		♃		♂		♀		☿	
D.	South	Dec.	South	Dec.	South	Dec.	South	Dec.	South	Dec
	h m	° ′	h m	° ′	h m	° ′	h m	° ′	h m	°
1	13 4	3 S 40	10 46	15 S 50	3 38	14 S 59	0 20	7 N 36	☌	4 N
4	12 52	3 45	10 34	15 57	3 35	15 38	0 23	6 8	23 32	5
7	12 41	3 51	10 22	16 3	3 32	16 17	0 26	4 40	23 16	7
10	12 29	3 57	10 10	16 9	3 29	16 56	0 29	3 9	23 4	8
13	12 17	4 3	9 59	16 14	3 26	17 33	0 31	1 36	22 57	9
16	12 6	4 9	9 47	16 19	3 24	18 11	0 34	0 6	22 56	9
19	11 54	4 15	9 35	16 24	3 21	18 45	0 37	1 S 27	22 58	9
22	11 43	4 21	9 24	16 28	3 19	19 20	0 40	3 0	23 3	8
25	11 32	4 27	9 13	16 31	3 16	19 52	0 43	4 30	23 9	6
28	11 20	4 32	9 1	16 34	3 14	20 24	0 46	6 1	23 17	4
D.	OCTOBER.									
1	11 8	4 S 37	8 40	16 S 37	3 12	20 S 55	0 49	7 S 34	23 26	2
4	10 57	4 42	8 38	16 38	3 10	21 23	0 52	9 1	23 34	0
7	10 45	4 47	8 27	16 39	3 9	21 50	0 55	10 29	23 43	2
10	10 33	4 51	8 15	16 40	3 7	22 15	0 58	11 52	23 51	4
13	10 21	4 56	8 4	16 40	3 6	22 48	1 1	13 14	23 59	6
16	10 9	5 0	7 53	16 39	3 4	23 0	1 4	14 33	0 3	8
19	9 57	5 4	7 42	16 38	3 2	23 21	1 8	15 48	0 11	10
22	9 45	5 8	7 31	16 36	3 0	23 39	1 11	17 0	0 18	12
25	9 33	5 12	7 20	16 33	2 58	23 54	1 15	18 8	0 24	14
28	9 21	5 15	7 9	16 30	2 56	24 8	1 18	19 13	0 29	16
D.	NOVEMBER.									
1	9 4	5 S 19	6 55	16 S 26	2 54	24 S 22	1 22	20 S 32	0 43	18
4	8 52	5 21	6 44	16 22	2 52	24 30	1 25	21 25	0 49	20
7	8 40	5 22	6 33	16 17	2 50	24 35	1 29	22 12	0 54	21
10	8 28	5 23	6 22	16 11	2 47	24 39	1 33	22 54	1 0	22
13	8 16	5 24	6 11	16 5	2 45	24 40	1 36	23 28	1 6	23
16	8 4	5 25	6 0	15 59	2 43	24 S 38	1 40	23 58	1 12	24
19	7 51	5 25	5 49	15 52	2 41	24 35	1 43	24 21	1 18	25
22	7 39	5 25	5 38	15 45	2 39	24 28	1 47	24 38	1 23	2
25	7 26	5 24	5 27	15 37	2 36	24 20	1 51	24 48	1 28	2
28	7 13	5 23	5 16	15 29	2 33	24 14	1 54	24 50	1 31	2
D.	DECEMBER.									
1	7 0	5 S 22	5 3	15 S 21	2 30	23 S 56	1 58	24 S 46	1 31	2
4	6 47	5 20	4 52	15 12	2 27	23 40	2 1	24 34	1 27	2
7	6 34	5 18	4 41	15 2	2 24	23 20	2 4	24 17	1 21	24
10	6 21	5 15	4 29	14 52	2 21	22 59	2 7	23 52	1 9	2
13	6 8	5 12	4 18	14 42	2 18	22 35	2 10	23 22	0 47	2
16	5 55	5 9	4 6	14 31	2 14	22 10	2 13	22 45	0 19	2
19	5 42	5 5	3 55	14 21	2 11	21 42	2 15	22 1	23 39	2
22	5 29	5 1	3 43	14 10	2 7	21 11	2 18	21 13	23 12	2
25	5 16	4 57	3 32	13 58	2 4	20 40	2 20	20 18	22 52	2
28	5 3	4 53	3 21	13 45	2 0	20 5	2 22	19 19	22 35	2

N. B. *We had not Room for the* cœleſtial *Phænomena and Obſervations,* 1760.

NewTABLE of the *Radical* Mean *Places* and *Motions* of the MOON from the Su conſtructed from the *Aſtronomia Arcana.* For *Greenwich-Obſervatory.*

Julian or old Style.

Yrs of Chr.	M. Plac. ☽ fr. ☉			
Chr. 1	2s	13°	43′	38″
1600	10	7	51	0
1700	8	14	58	58
1740	5	11	50	9

Gregorian or new Style.

B. 1600	6s	5°	56′	33″
C. 1700	4	0	53	4
B. 1760	5	11	9	51
C. 1800	1	25	49	35

Julian Yrs.	M. Mot. ☽ fr. ☉			
20	4	13	25	36
40	8	26	51	11
60	1	10	16	47
80	5	23	42	23
100	10	7	7	58
200	8	14	15	56
300	6	21	23	54
400	4	28	31	52
500	3	5	39	50
600	1	12	47	48
700	11	19	53	46
800	9	27	3	44
900	8	4	11	42
1000	6	11	19	40
2000	0	22	39	20
3000	7	3	59	0
4000	1	15	18	40
5000	7	26	38	20
6000	2	7	58	0

Jul. Yrs.	M. Mot. ☽ fr. ☉			
1	4s	9°	37′	25″
2	8	19	14	51
3	0	28	52	15
4	5	20	41	7
5	10	0	18	32
6	2	9	55	58
7	6	19	33	22
8	11	11	22	14
9	3	20	59	39
10	8	0	37	5
11	0	10	14	29
12	5	2	3	21
13	9	11	40	46
14	1	21	18	12
15	6	0	55	36
16	10	22	44	28
17	3	2	21	53
18	7	11	59	19
19	11	21	36	43

Months.	M. Mot. ☽ fr. ☉			
Jan.	0s	0°	0′	0″
Feb.	0	17	54	48
March	11	29	15	16
April	0	17	10	3
May	0	22	53	23
June	1	10	48	11
July	1	16	31	32
Auguſt	2	4	26	20
Sept.	2	22	21	8
Oct.	2	28	4	29
Nov.	3	15	59	17
Dec.	3	21	42	37

Days.	M. Mot. ☽ fr. ☉			
1	0s	12°	11′	27″
2	0	24	22	53
3	1	6	34	20
4	1	18	45	47
5	2	0	57	13
6	2	13	8	40
7	2	25	20	7
8	3	7	31	24
9	3	19	43	0
10	4	1	54	27
11	4	14	5	54
12	4	26	17	20
13	5	8	28	47
14	5	20	40	14
15	6	2	51	40
16	6	15	3	7
17	6	27	14	34
18	7	9	26	0
19	7	21	37	27
20	8	3	48	54
21	8	16	0	21
22	8	28	11	47
23	9	10	23	14
24	9	22	34	41
25	10	4	46	7
26	10	16	57	34
27	10	29	9	1
28	11	11	20	7
29	11	23	31	54
30	0	5	43	21
31	0	17	54	48

Lp. Yr. take out for a Day leſs in *Jan.* and *Feb.*

	Mo. ☽ fr ☉				Mo. ☽ fr ☉				Mo. ☽ fr ☉				Mo. ☽ fr ☉				Mo. ☽ fr ☉		
H. M. S.	° ′ ″	′ ″ ‴	″ ‴ iv	H. M. S.	° ′ ″	′ ″ ‴	″ ‴ iv	H. M. S.	° ′ ″	′ ″ ‴	″ ‴ iv	H. M. S.	° ′ ″	′ ″ ‴	″ ‴ iv	H M. S.	° ′ ″	′ ″ ‴	″ ‴ iv
1	0	30	29	13	6	36	12	25	12	41	55	37	0	18	48	49	0	24	53
2	1	0	57	14	7	6	41	26	13	12	24	38	0	19	18	50	0	25	24
3	1	31	26	15	7	37	9	27	13	42	53	39	0	19	49	51	0	25	54
4	2	1	54	16	8	7	38	28	14	13	21	40	0	20	19	52	0	26	25
5	2	32	23	17	8	38	6	29	14	43	50	41	0	20	50	53	0	26	55
6	3	2	52	18	9	8	35	30	15	14	18	42	0	21	20	54	0	27	26
7	3	33	20	19	9	39	4	31	0	15	45	43	0	21	50	55	0	27	56
8	4	3	49	20	10	9	32	32	0	16	15	44	0	22	21	56	0	28	27
9	4	34	17	21	10	40	1	33	0	16	46	45	0	22	51	57	0	28	57
10	5	4	46	22	11	10	29	34	0	17	16	46	0	23	22	58	0	29	28
11	5	35	15	23	11	40	58	35	0	17	47	47	0	23	52	59	0	29	58
12	6	5	43	24	12	11	27	36	0	18	17	48	0	24	23	60	0	30	29

EMENDATION of the PALLADIUM for 1759.

Page 74. For *March* 0, $1^s\ 29^\circ\ 9'\ 11''$ read $1^s\ 28^\circ\ 9'\ 11''$, an important C rection.

We are ſorry to object to the *abſurd* and *obſcure Anſwer* to the X. *inconſiſtent* Q 140, at P. 64. by Mr. *Rubes*, or *Rebus*. Which Queſtion, when *conſiſtently* ſta is beſt and readieſt reſolved by the Method of *Trial and Error*, as we have ſhewn P. 305, of our *Royal Aſtronomer and Navigator*. — The new *Navigation Queſtion* h been conſiſtently propoſed thus.

A Ship ſailed from the Lizard, *Lat.* 49° 55′ N. *on a conſtant but unknown Cou between the South and Weſt*, 3429,38 *Miles or Minutes of a Degree, till ſhe found Difference of Longitude to be* 53°: *Required her Courſe, and the Latitude arrived in*

☞ Our *Aſtronomia Accurata* or *Royal Aſtronomer and Navigator* is printed as fa P. 360, to the 45th Sheet, in Quarto, and only wait for the *Moon*'s new impro *Theory* and *Precepts*, when it will be *delivered to the Subſcribers and then publiſh* It compriſes the Buſineſs of three Subjects, *viz. Practical Aſtronomy*, *Chronol* and *Navigation*; and will be ſold for more than the Price ſubſcribed for, beca of its Plan being augmented. — We doubt not its giving Satisfaction for its *Uſef neſs*, and therefore we are under no frightful Apprehenſions for what the Cri ſhall be pleaſed to ſay of it. In it we have amply repaired the Loſs of, if not exce the long ago promiſed *Uranographia Brittanica*, by a correct Catalogue of Stars, w their *Declinations*, *Right Aſcenſions*, and their annual *Variations*, given, to ſhew t there are Honour and *moral* Honeſty, yet among Authors, to Subſcribers.

N. B. Thoſe who are pleaſed to be Subſcribers to the Work muſt ſubſcribe for with or the Subſcription will be cloſed, The Names of the laſt Subſcribers are follow.

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Mr. *Bevil*, Maſter of *Harpſwell-School*, *Lincolnſhire*	1
Rev. Mr. Archdeacon *Baſſet*	1
Mr. *James Carter*, near *Oxford*	1
Mr. *Stephen Fytche*, *Gainſborough*, *Lincoln*	1
Mr. *Emerſon*, at *Hurworth*, County of *Durham* . . .	1
Mr. *John Buddle*, *Cheſter-lee-ſtreet*, near *Durham* . . .	1
Mr. *Iſaac Tarrat*, at *Epſom*	1
William Jones, M. D. near *Maidſtone*, *Kent*	2
Captain *Thomas Simpſon*, *Whitby*	1
Mr. *George Stapley*, at *Scots-Flot*, near *Rye*	1

N. B. If any more Gentlemen have lately ſubſcribed, unknown to the Auth they are deſired to ſend him Notice thereof, with their Names and Places of Abode

*** *Thoſe who pleaſe to be Contributors to the* Palladium *are deſired to direct* th *Letters* (franked *or* Poſt paid) *for the* Palladium *Author to be left at Mrs.* Sarah Ha fax's, *at the* Dial and Fan, *in* Fleet-ſtreet, London; *except they are pleaſed to* ſ *their Letters* (franked or Poſt paid) *directly to the Author.*

25 OC 65

Long may *Britiſh Colours* fly on the Walls of *Quebec*,
And *Townſhend*'s* bold Stroke ſever Tyrant *Gallia*'s Neck!

*Which *General*, ſeizing the Opportunity, gave the finiſhing Stroke, in adding t important Empire of all *North America* to the Crown of *Great Britain*: bravely e ecuting the *Plan* of the glorioſly fallen but *immortal General Wolfe!* when th was but a *ſmall Interval* betwixt the Repulſe of an *inferior* Army and the glori Conqueſt of an important City, and depending Empire. — The Brave *Admi Saunders*, and Sea-Forces, ſhared in the Glory of this Enterprize!

FINIS CORONAT OPUS